A CHILTON PUBLICATION

the Iron Age

E NATIONAL METALWORKING WEEKLY

September 10, 1953

NTS PAGE 2

UNIV. OF MICHIGAN
SEP 10 1953
EAST ENGINEERING

evolution in Accuracy

e work . . . submarine
. . . aerial photography
e Hiller helicopter is a
ile performer. It can
in one place, move up
own, forward and back-
That's why the Hiller
nds bearings that carry
ds, that *stay* rigidly
te, even under sudden
in blade speeds. New
rture meets that demand
earings for Hiller appli-
s shown below. Besides
heavy-duty applications,
Departure makes a wide
of minute bearings
ensitive aircraft instru-
. *Every* New Departure
g—from midget to giant
acked by the industry's
complete research and
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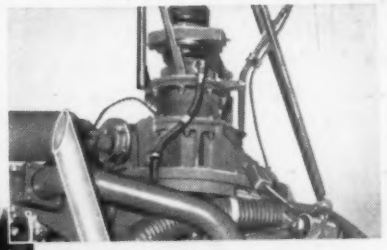
anufacturers' design
ngineering staff.



▲ **Main transmission** of the Hiller helicopter uses New Departure bearings in the clutch assembly.

◀ **Tail rotor gear box,** another of the Hiller's vital moving parts, is equipped with New Departure ball bearings.

NOTHING ROLLS LIKE A BALL

NEW DEPARTURE
BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT
Also Makers of the Famous New Departure Coaster Brake

How Hot can a Jet Get?

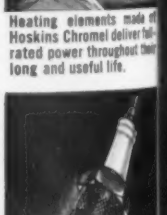
Whoooosshh! Jet engines generate a powerful amount of heat . . . heat which, uncontrolled in flight, would cause disastrous metallurgical distortions within the delicately balanced engine. So the problem is . . . or rather *was* . . . how to provide a dependably accurate means of measuring exhaust temperatures so that the pilot might have control over how hot his jets get.

And the answer? Special wiring harnesses running from engine to instrument panel . . . harnesses now made exclusively with Hoskins Chromel-Alumel thermocouple alloys.

Yes, wherever durability and accuracy are required in a thermocouple . . . whether for jet engines or industrial furnaces . . . you'll find Chromel-Alumel *right* for the job. Extremely durable . . . highly resistant to heat, corrosion, oxidation . . . guaranteed to register true temperature-E.M.F. values within specified close limits.

That's only part of Hoskins' product picture, though. Other specialized quality-controlled alloys developed and produced by Hoskins include: Alloy 785 for brazing belts; Alloy 717 for facing engine valves; special alloys for spark plug electrodes; Alloy 502 for heat resistant mechanical applications. And, of course, there's Hoskins CHROMEL . . . the *original* nickel-chromium resistance alloy used as heating elements and cold resistors in countless different products.

Heating elements made of Hoskins Chromel deliver full-rated power throughout their long and useful life.



Sparks fly better, last longer in today's spark plugs . . . thanks to Hoskins' spark plug electrode alloys.

Hot stuff for hot jobs! Hoskins Alloy 502 is ideally suited to many mechanical-structural applications.

Chromel® NICKEL CHROMIUM WIRE

HOSKINS

MANUFACTURING COMPANY

4445 LAWTON AVENUE, DETROIT 2, MICHIGAN

When Are You Justified in Using a Special Alloy Steel?

Probably not more than 5 pct of all alloy-steel applications justify the use of special grades. And these relatively few cases are the ones in which the main properties sought are resistance to heat, or corrosion, or low-temperature impact. Generally speaking, there are no other advantages to be gained by using special grades of alloy steel.

In the remaining 95 pct of all applications, whether civilian or military, the standard AISI grades of alloy steel will meet the usual requirements for strength, hardness, and ductility.

There are two big advantages in using standard grades. (1) Their chemical ranges usually fall within closer limits than those of the non-standard grades. This means that standard methods of heat-treatment can be used, and the results can be predicted to a closer degree. (2) Smaller tonnages of standard grades can be bought, eliminating the need for large, costly inventories. A non-standard grade is produced and sold only in heat lots.

If you have any kind of problem concerning alloy steels, their heat-treatment or applications, you can count on our metallurgists for unbiased advice. We manufacture and sell the entire range of AISI standard grades of alloy steel, as well as special-analysis steels and carbon steels.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM ALLOY STEELS

BETHLEHEM STEEL

The Iron Age

Vol. 172, No. 11, September 10, 1953

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DIGEST of

NEWS DEVELOPMENTS

OPTICAL INSTRUMENT USE GROWING FAST — P. 101
Confined mainly to schools and labs before World War II, optical instruments have invaded industry with a bang. This year the field expects sales 10 to 15 pct over 1952. Emphasis on quality control and precision have proven the value of optical testing equipment on the production line. Microscopes have greatest use.

DO DIPPING STOCKS PORTEND BAD BUSINESS?—P. 103
The Iron Age this week invites a leading stock market analyst to give his views on the future of business based on today's declining stocks. Wall Street failed as an indicator in 1946—but other factors present today may make it right this time. It could take several years to find out.

STEEL'S OVERHAUL AWAITS DEMAND LETUP — P. 104
There will be no weeping by steel mill maintenance chiefs over prospects of a reduced ingot rate in the fourth quarter. They'll welcome the opportunity to do a thorough overhaul of equipment that may come out of production if order books lose some of their fat. Many overworked mills are ripe for the job.

RAILROADERS EXPECT SLIGHT FREIGHT DIP — P. 108
Volume of freight traffic moving over the nation's rails in the last 4 months of the year will probably be under the same period of 1952—but not much. Next year's volume is anybody's guess since rail business depends on manufacturing volume. Higher freight rate demands could result if labor wins big hikes.

EXPERIMENTAL CARS PROVE SOLID WORTH — P. 118
Futuristic experimental cars are no longer regarded as publicity stunts by automaking executives. They have proved their practical value both as laboratories on wheels and as testers of public opinion. Some have been shifted over to regular production, and all will influence '54 models. Hudson unveils Italia.

STRESS FLEXIBILITY IN DEFENSE PLANNING — P. 123
With Army-Navy-Air Force production now in sight, Pentagon must decide at what capacity pilot plants will be kept in operation. Another important phase of mobilization planning is to keep skilled labor force intact. Present Defense Dept. plan includes the possibility that some plants will be closed down.

the Week in Metalworking

ENGINEERING & PRODUCTION

VINYL PLASTISOLS RESIST CORROSION — P. 159
Vinyl plastic coatings are being used for an increasing number of applications to replace highly ferrous alloys and nonferrous alloys. Outstanding resistance to corrosion, remarkable toughness and resiliency are characteristic properties. New formulations, better techniques have improved their usefulness.

STRETCH WRAP FORMING CAN CUT COSTS—P. 163
More and more shops are stretch wrap forming large parts from sheetmetal, extrusion or brake and roll formed sections. Important steps in the method are building and use of the forming dies. Kirksite, Masonite, hardwood, steel, cast dural plate and phenolics have all been used successfully.

ALUMINUM ALLOYS MAKE GOOD BEARINGS—P. 168
Aluminum alloys have proved to be a good bearing material for rolling mills and rolling mill equipment. Two alloys were tested extensively over a 6-year period. Solid aluminum bearing bushings performed satisfactorily at much higher operating temperatures than softer materials.

DIRECTIONALITY AND METAL PROPERTIES — P. 170
Physical properties of wrought alloys change with directionality. Strength, ductility, impact and fatigue properties are affected in varying degrees depending on the metal and working process used. Several factors decrease ductility with stress concentration and crack propagation ensuing.

CESIUM ISOTOPE NEW INSPECTION TOOL — P. 174
Cesium 137 is being used to inspect for part defects and misalignment. A 33-year half life promises to give it wider use as an inspection tool for companies doing a limited amount of work. It has an intermediate energy level and bridges the gap between iridium 192 and cobalt 60.

NEXT WEEK—USE MORE CARBON STEEL IN BOLTS
Hardenability is important when replacing a highly alloyed steel with a leaner alloy or carbon steel. Small diameter coarse thread bolts previously made of a molybdenum alloy can be made of C 1040 steel without sacrificing strength. Better heat treating is the controlling factor.

MARKETS & PRICES

NEW PRODUCTS CAN LIVEN METAL MARKET—P. 105
Metal demand, in general, rides up and down with the graph of industrial activity. But any individual metal can get a healthy boost even in a declining period by new products or new applications of that metal. Vast growth in the aluminum industry proves it. An aggressive marketing program helps.

LOCK NUTS HOLDING DOWN A GOOD MARKET—P. 107
Tiffanys of the fastener industry, lock nut makers are feeling pretty chipper these days. Defense cutbacks and softness in some civilian lines have their effects, but new orders are coming in at a good clip and new applications are turning up with pleasing frequency. Volume buyers are getting aboard.

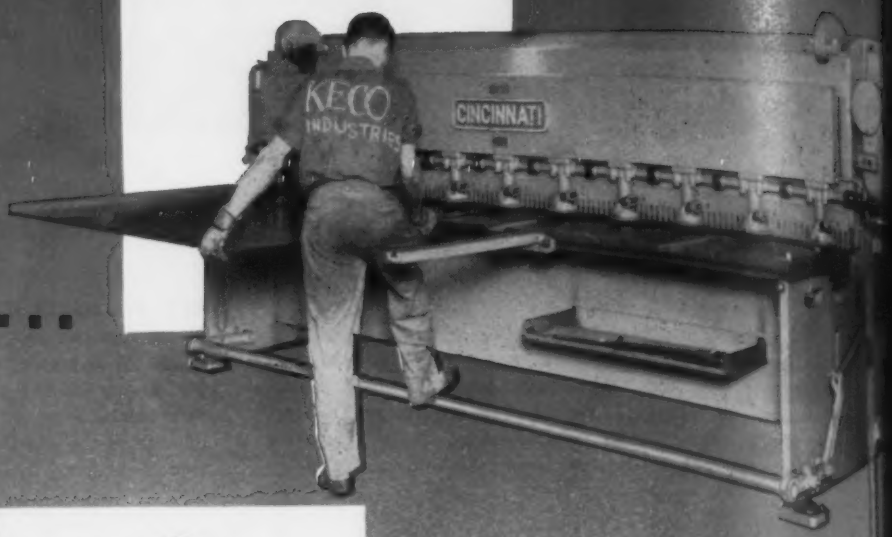
GEAR MAKERS CONFIDENT ON SECOND HALF — P. 129
Despite some falling off in orders, outlook for gear manufacturers continues bright for the rest of the year. Indications are that business will stay at about the same high levels as last year. The summer was slow but the industry has a 6 to 7 month backlog to keep it busy for the rest of the year.

MANUFACTURERS' PROFIT MARGINS SHRINK — P. 131
Like a dollar shirt your profits per dollar of sales have shrunk remarkably over the years. Yet industry paradoxically has posted peak profits despite the adversities of higher taxes, spiraling labor and materials costs. Vastly expanded production is the answer. Don't let your selling relax.

STEEL USERS SNUB EXTRA FREIGHT CHARGES—P. 215
Cost-conscious steel users are chafing under burden of extra freight charges for steel delivered from out-of-area mills. Mills must either retreat from distant markets or absorb freight when scales tip in favor of supply. Pressure to obliterate extra freight will heighten in fourth quarter, run into '54.

COPPER, BRASS MILL PRODUCT PRICES CUT — P. 218
New lower prices for brass and copper mill products went into effect. They reflect copper at 30¢ rather than the earlier average of U. S. and Chilean prices. It's reported that Chile's president has signed a decree permitting export of copper to Red countries. Zinc price trimmed to 10½ per lb.

3 times as fast...



Photographs courtesy of the Keco Industries, Cincinnati 25, Ohio

with this CINCINNATI team

Cooling towers for portable air conditioning units

The floor-to-floor time consumed in shearing and forming panels for air-conditioning units, was cut from 12 minutes to 4 minutes at Keco Industries, using a Cincinnati Brake and a Cincinnati Shear.

Accuracy and rapid handling effected these savings.

In your shop, there may be opportunity for real costs reductions. Investigate Cincinnati Shears and Cincinnati Press Brakes.

Write for Cincinnati Shear Catalog S-6 and Cincinnati Brake Catalog B-4.

CINCINNATI

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

Dear Editor:

Letters from readers

Colloidal Graphite

Sir:

In my article "How Colloidal Graphite Protects Bearing Surfaces" in the July 9th issue, there occurs the sentence "Molybdenum disulphide is unsuitable for use in lubricating oils. Its application is limited to special lime base or other greases."

A number of letters have reached me querying the accuracy of this downright statement, which is not surprising, as it is obviously incorrect and contrary to the whole purpose of the article.

The only explanation seems to be that in editing and cutting down the original manuscript, a mistake was inadvertently made.

HOWARD WARBURTON
Technical Representative
Magnolia Anti-Friction Metal Co.
London, England

The original manuscript read: "Molybdenum disulphide, being a heavy material, is unsuitable for incorporating in ordinary lubricating oils and is therefore limited in its applicability, as it must of necessity be present only in the form of specialized lime base or other types of greases.—Ed.

August 20th Cover

Sir:

We were very much impressed with the cover page on your August 20th issue. We wonder if you would be good enough to give us the name of the company in which this photograph was taken.

LEONARD KIRTZ
Nicholas Equipment Co.
Bellevue, Ohio

The photo used in the Brown & Sharpe advertisement on this cover was taken by a Brown & Sharpe photographer in their own shop.—Ed.

National Metal Show

Sir:

Please advise where to apply for tickets to the National Metal Show at Cleveland to be held from Oct. 19 through 23.

E. M. BAILEY
Bailey Mfg. Co.
Waltham, Mass.

They may be obtained from the Registration Committee, 7301 Euclid Ave., Cleveland 3, Ohio.—Ed.

Metal Cleaning

Sir:

We are interested in the short descriptive article on metal cleaning by high frequency vibration in a liquid bath which appeared in your April 9th issue on p. 150.

We should be pleased if you could furnish us with more information on this subject.

B. S. BARHAM
Research Metallurgist
M. B. John, Ltd.
Ballarat, Victoria, Australia

The Detrex Corp., Detroit 32, Mich., developed this new process. We suggest you contact them for full details.—Ed.

New Soldering Flux

Sir:

I read with great interest your item on aluminum solders and fluxes which appeared in the Newsfront page of the August 13th issue. I would appreciate any further information you may have, also the manufacturer's name and address.

J. M. FINLAY
Tool Engineer
Gorham Mfg. Co.
Providence, R. I.

Full details are given in an article in the September 3rd issue. McCord Corp., Riopelle at E. Grand Blvd., Detroit 11, Mich., developed these new fluxes.—Ed.

Iron Ore Contract

Sir:

There was an item in the August 20th issue, p. 60, on the Quijotoa mining district ore deposit. Will you please give me further information about this?

HUGO NEU
Hugo Neu Corp.
New York, N. Y.

Further information can be obtained from Mr. L. C. Butler, 1746 Richmond Ave., Staten Island 14, N. Y.—Ed.

"Renite" Plastic

Sir:

Can you please tell me where I can buy the new "Renite" plastic described in the August 6th issue under the title "Glass Laminated Plastics Speed Up Tooling Programs?"

A. WINTER
Plant Superintendent
Geo. T. Schmidt, Inc.
Chicago, Ill.

This plastic is available from Renite Plastics, Inc., P. O. Box 1256, Lansing 4, Mich.—Ed.

Cartoon Reprint

Sir:

Permission is requested to reprint the cartoon on p. 73 of your July 23 issue to be used in the Boston Naval Shipyard News in connection with a safety campaign which we are now conducting.

F. R. CUMMINGS
Administrative Asst.
Boston Naval Shipyard
Boston, Mass.

WHO ELSE BUT A

Specialist

WOULD HAVE JUST THE SPRING STEEL
(ANNEALED OR TEMPERED)
YOU NEED ?

OF COURSE WE MEAN
KENILWORTH STEEL

HERE IS A WIDE VARIETY OF SIZES, TYPES AND FINISHES TO CHOOSE FROM

You should see the spring steel department here at Kenilworth (you're invited to visit us anytime) with all the facilities to provide customer service. Many aisles of "in stock" material in the humidity and temperature controlled room shows you how fussy we are about doing the job right. And you'll find even the most uncommon spring steel types for unusual requirements. But as we said it's the role the specialist should play—meeting exacting spring steel specifications and needs—for a few pounds or many—we're doing it every day and we would like to talk about serving your requirements at your request.

THE Kenilworth Steel co.

750 BOULEVARD, KENILWORTH, NEW JERSEY
SPECIALISTS IN FLAT ROLLED METAL PRODUCTS
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Teletype: Roselle, N. J., 387

Another PLIOWELD Success

RUBBER LINING IN PICKLE TANK GIVES 4 TIMES THE SERVICE

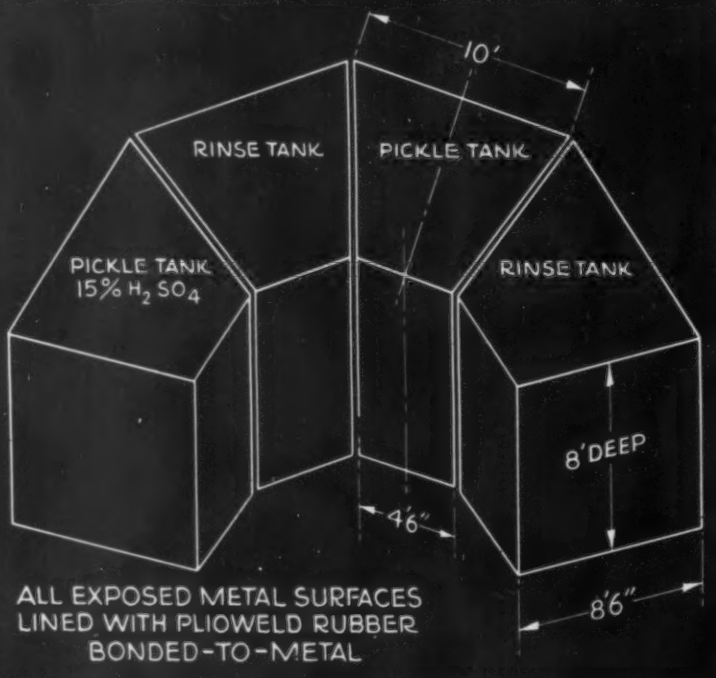
TANK LINING

15% solution of H_2SO_4, operating at 200°F., used in batch pickling tanks for major appliances. Ordinary mastic type plastic lining formerly used failed in abusive service after 6 months service—cost 1½ times Goodyear's bonded-to-metal lining of PLIOWELD rubber that served 2 years to date and still is in service.

Additional advantage — PLIOWELD can be quickly and easily repaired as needed.

GOODYEAR INDUSTRIAL PRODUCTS

GTM-Specified PLIOWELD LINING FOR PICKLE TANK



ALL EXPOSED METAL SURFACES LINED WITH PLIOWELD RUBBER BONDED-TO-METAL

Whenever corrosives or abrasives attack metal surfaces—in pipe lines, tanks, tank cars, fans and ducts, etc. —it will pay you to discuss PLIOWELD with the G.T.M.—Goodyear Technical Man. He will gladly recommend a PLIOWELD lining matched to your particular needs — one that will give you all these benefits:

LOWER OVER-ALL COST

because PLIOWELD measurably increases the service life of costly equipment

LOWER MAINTENANCE COSTS

because PLIOWELD eliminates daily inspections and frequent maintenance shut-downs

IMPROVED PRODUCTION

where PLIOWELD-lined equipment handles production items, because the lining won't slough off or contaminate liquids.

Ask the G.T.M. about PLIOWELD linings — everything from pipes and fittings to railroad tank cars—or write Goodyear, Industrial Products Division, Akron 16, Ohio.

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose (air, water, steam, oil, special), Belting (V-belts, transmission, conveyor, elevator), and other industrial rubber products. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

GOODYEAR

THE GREATEST NAME IN RUBBER

We think you'll like THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

Pliowold—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

Fatigue Cracks

by William M. Coffey

Handbook of Terms

It's time we came clean on the Handbook of Terms. Judging from the letters that keep pouring in calling us all kinds of names, we're sure most of you are aware that we have published this epic. At least that's the general impression we get from the tone of the letters. Guess it's best to start this off by showing you a letter from a Detroit subscriber that is typical:

Dear Sir:

I first noticed your Handbook of Terms when it was printed in an Iron Age issue last spring. Because I had been looking for something like this for many years with no success, I cut it out, glued it together, put a cover on it and now keep it on my desk, referring to it often. You did a great service in printing it.

Recently I have seen some subscription letters from you that indicate you have separately bound this handbook and are offering it free to new subscribers.

I have been a subscriber for 10 years, yet it looks like I'd have to take out another subscription to get this valuable book. I don't think that's playing fair. If anyone should be entitled to a free copy of this it should be your old subscribers.

Although I'll always be a subscriber I don't need two subscriptions but I do want the book. Please send it to me.

Sincerely,

G. B. H.

After much pow-wow we've decided Mr. Banks and his thousands of friends are right, so present subscribers will now get a free copy of the Handbook of Terms with our compliments and hearty thanks for just being subscribers. This is going to cost us some cabbage, so treat your handbook with loving care. Only one hitch to this, however. According to the rules of the publishing fraternity we may not give the Handbook away except in return for a renewal subscription. So keep in mind that when your subscription comes up for renewal you can obtain your personal copy of the Handbook of Terms simply by asking for it and to further show our esteem we'll even emboss your name on the cover in gold. You've won. We surrender. Please write no more letters.

(Must make a mental note to tell the editorial department that they make it awfully tough on the Circulation Department when they print so popular a handbook.)

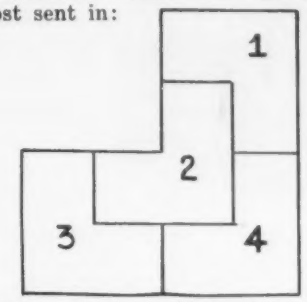
A LA CARTE

Mad-Jacks, the restaurant in Charleston, West Va., where we had such delicious *Stuffed Schlumeel with Triffles*, has sent us a new menu. Perhaps some of these items tickle your fancy: *Shrimp Al La Gimp* for $11.75 or perhaps you'd like the *Lobster, En Garde* for $16.50.

And the main course you can now get *Hog On Ice* ($35.00) *Saddle of Mule (with or without stirrups)* at $25.00 or *Barbequed Short Grits of Reef* for 6 bits. For vegetables take your choice of *Fresh Cliches, Mixed Metaphors, Split or Stuffed Infinitives* or *French Fried Colons*. Only one new dessert—*Ice Cream with Mustard.*

Puzzlers

There are several solutions to the farmer who left his land to his four sons, without counting on a debtor to come along and upset the equilibrium. Here's the one that most sent in:



The winners, this solution or others: M. E. Padin, J. J. Darby (no, balloon wasn't anchored), Kenneth A. Roth who also solved the power line and spider puzzlers, A. Lynch, L. R. Ledbetter, J. T. Hershey, H. R. Boyer, Patt Meara, F. J. Foersterling, Floyd A. Miller, L. B. Sutherland, E. E. Murphy, W. B. Lobbenberg, Milfred Berkey and Mr. Rice.

Correct solution to the prisoner puzzler: put one white ball in one box and the other 19 (9 white, 10 black) in the other box. Winners: Sy Levin, Josephine Ardovino, Kenneth Roth, Ed Meagher, J. J. Brugman, M. W. Laine, S. B. Fertig, C. H. Guy, Fred Everett, Andrew Chambers, J. C. Domingo, Raymond Frisch, Charles Hammer and Mr. Rice.

New Puzzle: It's too hot for a tough one, so try this: *Two people. One points to the other and says, "Brothers and sisters I have none, but that man's father is my father's son." What's their relationship?*

a significant advance

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RIMMED STEEL

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1. *Improves rimming action*
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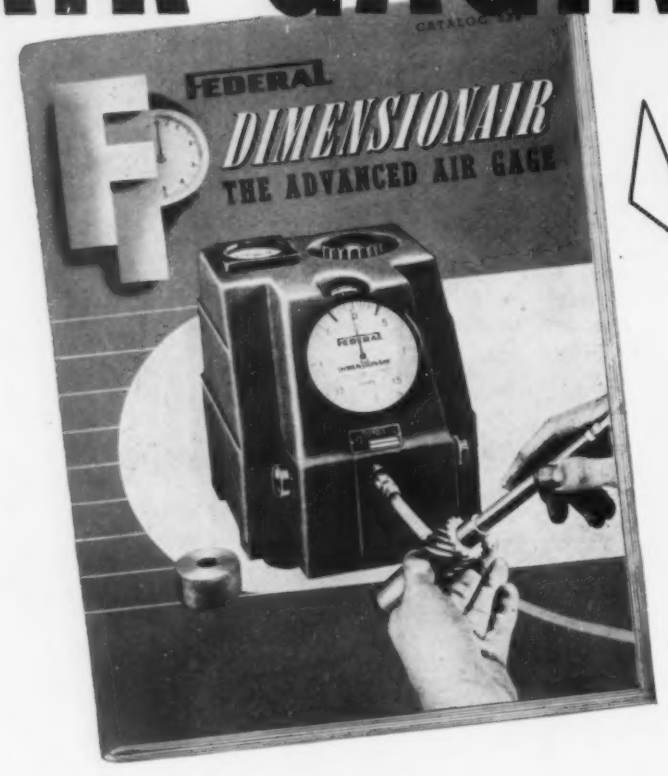

JUST OFF THE PRESS, this book contains up-to-the-minute, complete specifications for the Dimensionair. It explains the important advantages of the new balanced air system. It also tells about our entirely new air gage accessories — the Arnold Air Gage, Air Electric Switch, and Air Gaging Electronic Controls. You will also find useful tables showing plug, ring, and air snap sizes available from stock. Here, conveniently available in one attractive catalog, is a fund of the latest authoritative reference data on the Air Gage, developed by Federal during many years study of actual shop use requirements and engineering research. Ask for your copy today and profit from this valuable new book.

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Dates to Remember

Meetings

SEPTEMBER

ELECTROCHEMICAL SOCIETY — Fall meeting, Sept. 13-16, Wrightsville Beach, N. C. Society headquarters are at 235 W. 102nd St., New York.

AMERICAN HOT DIP GALVANIZERS ASSN., INC. — Semi-annual meeting, Sept. 14-15, Statler Hotel, Cleveland. Association headquarters are at 1506 First National Bank Bldg., Pittsburgh.

NATIONAL PETROLEUM ASSN. — Annual meeting, Sept. 16-18, Traymore Hotel, Atlantic City, N. J. Association headquarters are at Munsey Bldg., Washington.

EXPOSITIONS

NATIONAL METAL SHOW—Oct. 19-23, Public Auditorium. Cleveland. American Society of Metals headquarters are at 1301 Euclid Ave., Cleveland.

NATIONAL FOUNDRY ASSN.—Annual meeting, Sept. 17-18, Plaza Hotel, New York. Association headquarters are at 53 W. Jackson Blvd., Chicago.

PACKAGING MACHINERY MANUFACTURERS INSTITUTE—Annual meeting, Sept. 20-23, Skytop Lodge, Pa. Institute headquarters are at 342 Madison Ave., New York.

TRUCK BODY & EQUIPMENT ASSN., INC.—Sept. 21-23, Sheraton-Gibson Hotel, Cincinnati. Association headquarters are at 1122 Dupont Circle Bldg., Washington.

AMERICAN MINING CONGRESS—Metal and Nonmetallic Mineral Mining Convention, Sept. 21-24, Olympic Hotel, Seattle. Headquarters are at 1200 18th St., Washington.

INSTRUMENT SOCIETY OF AMERICA—National Instrument Conference and Exhibit, Sept. 21-25, Chicago. Society headquarters are at 1319 Allegheny Ave., Pittsburgh.

NATIONAL ASSN. OF FOREMEN—Annual convention, Sept. 23-26, Milwaukee. Association headquarters are at 321 W. First St., Dayton.

NATIONAL ELECTRONICS CONFERENCE—Sept. 28-30, Annual conference, Hotel Sherman, Chicago. Headquarters are at 852 E. 83rd St., Chicago.

ASSOCIATION OF IRON & STEEL ENGINEERS — Annual convention, Sept. 28-Oct. 1, William Penn Hotel, Pittsburgh. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

THE PORCELAIN ENAMEL INSTITUTE—Annual meeting, Sept. 30-Oct. 2, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters are at 1346 Connecticut Ave., N.W., Washington.

The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

SOFT COAL OPERATORS ARE WORRIED over poor business, plus prospect of higher wages for coal miners. Tough competition has already led to price cutting, and outlook for balance of year and 1954 in not encouraging. Belief is that John L. Lewis will wait until heating season to show hand on wages. He can reopen contracts on 60-day notice.

SILVER AND SILVER BASE ALLOYS are best for brazing titanium to titanium and to mild stainless steels, a recent study has shown. Joints with shear strengths averaging 15,000 psi were obtained by furnace brazing in an atmosphere of high purity argon.

FALL WILL BE A GOOD TIME to go shopping for a new car. Cleanup problem for some automakers will be the most serious it has been in years. Some models can be had for as little as $100 over cost to the dealer.

INSURANCE LOSS ON THE GM TRANSMISSION PLANT FIRE was practically double the largest single previous industrial loss in U. S. insurance history. If the GM policy had also covered business losses the payoff would have been astronomical. Wholesale changes in industrial insurance requirements, building planning and fire control training and equipment will inevitably follow as a result of the GM inferno at Livonia.

GUIDED MISSILES AND HELICOPTERS may be next in line for budget cuts. Some substantial cuts are already reported in helicopter development and production and similar cuts could be in line for missile development and production.

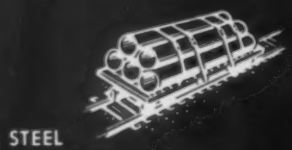
COUNTING SPEEDS up to 4000 pulses per second are said to be possible with a new glow transfer counting tube. Typical applications include high speed counting for packaging, accurate timing by counting of 60-cycle line pulses, very high speed machine operations.

OUTSTANDING COST REDUCTIONS plus improved production in finishing operations have been attained by one aircraft engine maker by systematic application of tumbling. Secret: Correct combination of granite chips, abrasives, compounds, plus fixturing, close timing, unusual cleanliness.

FIRST STEP toward erection of a V-8 engine plant in Cleveland at an estimated $60 million cost has been taken by Ford Motors. Excavators went to work last week on a 142-acre site for the new passenger car and truck engine plant. New plant will provide 562,000 sq ft of space, employ 3000 persons and is designed with future expansion in mind.

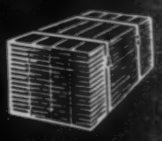
STEEL LOW IN NITROGEN and with physical properties comparable to open-hearth grades will soon be produced by a Canadian steelmaker in an oxygen steelmaking plant. A high quality steel produced from relatively low cost equipment has sold Canadians on the process.

DEFINITE CUTBACKS IN PROCUREMENT of some civilian supplies, with strong pressure for better inventory balance are Defense Dept. goals. Cuts will come in civilian passenger cars, trucks, office supplies, soap, etc. Reason: Inventories are strong and supply lines are healthy.



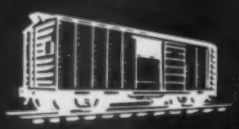
STEEL FABRICATORS

LUMBER MILLS

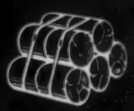


ARMED FORCES

BUILDING MATERIALS



GRAIN DOORS FOR RAIL CARS



PAPER MANUFACTURERS

TEXTILE INDUSTRY

MANUFACTURERS

SHIP CARGO SECURING

Forty years ago, the Signode Strapping System was introduced to growing industry. Today, though there have been followers, Signode methods are still the accepted standard of the strapping industry. The reason is not merely the quality of the steel strapping we have made, but in the quality and dependability of the *methods* offered to industry to use steel strapping.

Today, steel strapping and Signode methods have become an integral part of the businesses shown above, and thousands more, because Signode has worked directly with industry to find the means to move more goods for faster — safer — better handling and arrivals. We are proud to have played a part in the growth of industry by giving shipments the strength of steel that is insuring safe deliveries all over America and the world.

John D. Leslie

PRESIDENT

SIGNODE STEEL STRAPPING COMPANY
2623 North Western Ave., Chicago, Ill.
In Canada: Canadian Steel Strapping Co., Ltd.
Montreal • Toronto

OPTICS: Look Through Rose-Tinted Lenses

Optical equipment industry invades production lines . . . See business up 15 pct in '53 over '52 . . . Major instruments, uses listed . . . What can you use?—By K. W. Bennett.

Quality control, precision — increasingly important as emphasis trains on cost-cutting and productivity—are giving the optical equipment industry room to grow. Instrument makers are looking through a rose colored microscope for a business increase of from 10 to 15 pct this year over 1952.

This industry's success can be partly traced to high sales of photographic equipment but a substantial share derives from industry's hustling to add optical instruments to production lines and labs. Optical instrument makers advise manufacturers that failure to inspect their array of testing instruments may mean lagging behind in the efficiency race.

Glass-Eye Workhorse

But much interest is being kindled. As one prominent optical equipment maker told THE IRON AGE: "Never before have I witnessed such industry interest in microscopes and other instruments in peacetime."

World War II started the boom and it shows no signs of subsiding.

Workhorse in the optical instrument maker's line is the low power microscope. Selling for from $100 to $400 (sometimes higher), these instruments are coming onto the production line in greater numbers. Prior to World War II most microscopes were sold to educational institutions or laboratories.

Where Precision Counts

With the war, the sales picture switched. The majority now go to plants. Educational sales have been slipping but overall sales will be tops this year because of industrial buying, one producer said.

The increasing use of electronic equipment transistors, which call for minute inspection, has aided the boom. Small machine parts, watch parts, small insulators, electronic and electrical equipment, castings, have been inspected with the tried and true laboratory microscope. Resulting savings have amortized the cost of the microscopes, sold more of them to the same consumer.

TAKING STEEL'S PICTURE, operator adjusts spectrograph electrodes. Particle of steel is vaporized and picture is taken of light emitted so steel elements can be analyzed.

Binocular Preferred

One firm had trouble with small ceramic insulating inserts, which shorted out after being placed in an aluminum chassis. Microscope inspection disclosed tiny breaks in the insert walls which produced the short circuits. Rejects on the inspection line went up, but field failures of equipment dropped accordingly.

A standard microscope, mounted on a long swinging arm which moves easily over a large work surface, has been used in aircraft maintenance hangars to check parts as they are pulled off engines being serviced.

While the industrial microscope, generally from 10 to 40 power, is pretty much the same type used in high school biology, it is now always a binocular type. The old single eye-piece can cause eye strain when used to inspect long production runs. It was found the inspector would get a little bleary and pass some rejects.

Small monocular microscopes are available, but are not recommended for inspection for long periods. Foundries, machine tool builders, tool manufacturers, electronics, and many other industries are users.

Aligns Ship Propellers

Sales of the collimator, a kind of telescope, have been rising mildly since the war boomed aircraft production. It's used to hold a true reference line of jigs for

CREEP in test bar is checked by optical technique at American Brake Shoe Co.

aircraft wings and fuselages, or other industrial applications in which a long section must be built up and constantly aligned.

A similar system has even been used to align propellers on ocean going vessels, and a variant to align and level machine tools. These are special purpose tools, often built to order.

Once confined generally to research lab or steel mill, the metallograph has been moving out into manufacturing.

Burn Up Sample

Costing from $4000 to $5000 with accessories, these instruments magnify a piece of polished metal from 50 to 1500 times, show the types of metal, how they went into solution, what might have caused a piece of metal to fail. Used primarily in the heavier industries including automotive, basic steel, construction equipment, the metallograph has lately branched out into other supplier industries.

Pushing hard on the traditionally used metallograph is the spectrograph which determines chemical constituents of a metal when a minute sample is burned. It will reveal what chemicals are present, their relative amounts.

This unit costs up to $17,000 with accessories and does not have the popular appeal of the metallograph. But recently it has entered machine tool service, a lock plant, auto parts, a few large foundries, one large nonferrous metal former, and even battery plants.

Versatile Instrument

Given a considerable boost in World War II, the contour projector has been doing well since. It magnifies small parts 19 to 150 times on a screen that is 2 to 3 ft in diameter. When a master copy is etched on the projection screen, visual inspection of a small part is simple.

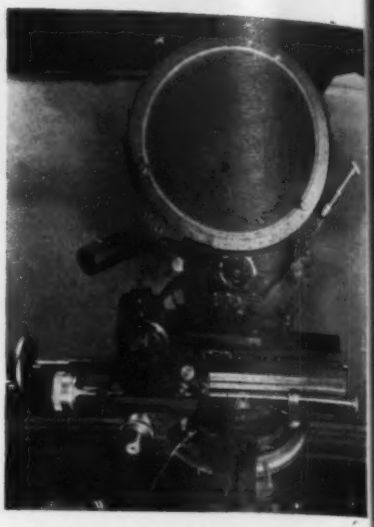
It checks gear teeth, taps, screws, hobs, stampings, and has even been used to make sample parts for which no drawing was available. Cost: $4000 to $7000 plus. An operator can be trained in about a week, readings can be made with high accuracy.

Foot's in the Door

Producers in liquid industries, including beer, oils, asphalt, and others, use the refractometer. Comparison of the liquid being tested is made with a refractive index, gives a pretty good indication of what's in the liquid and in what amounts. A classic case was the refractometer which trapped a sharper who was buying and thinning asphalt for resale.

As befits a good workhorse, the microscope has been rebred in a number of lines for more specialized applications. The toolmaker's microscope is used for both inspection and measurement. A shop microscope of pocket size is used by foremen and supervisors for on-the-spot inspections. Brinell microscopes are used for hardness testing.

"She does the work of three men, but she has to. They stand and watch her.



OPTICAL COMPARATOR by Jones & Lamson here being used to check graphs.

An optical thickness gage is correct to .00002 in., can handle anything up to a 3-in. cube, gives direct readings, costs $1750.

Optical equipment is still too expensive for a number of small shops. But with the increasing acceptance of the microscope, a foot has been put in the door that seems to pave the way for sales of higher priced equipment. An old timer on a sales force recalls his first call in the Chicago area.

He asked for the "Laboratory," was led to a room marked "Lavatory" and the call ended there. The same plant 20 years later boasts one full floor of laboratory space and, more important, its optical equipment requirements are moving to the production line.

Recently, industry has taken the bit into its own teeth. Lens producers report a larger number of orders from engineers who have designed their own special purpose instruments. These vary across the board in their applications, but indicate to the optical instrument designer he will have to move fast to keep up with demand for specialized optical equipment.

STOCKS: Omen of Declining Business?

After 1946 stock market dive business continued solid for years . . . This time it may be signalling danger . . . How buying apathy is depressing stock sales—*By Walter Gutman.*

Does the recent decline in the stock market foreshadow a decline in business?

The question can be answered to a degree. In summer 1946 the stock market acted much the way it has this summer—and the summer ended with a crash. Wall Street veterans of the autumns of 1937 and 1929 heard the din and expected business to take a cyclical nosedive. But business boomed for 3 solid years—and the market failed as an indicator of actual business developments.

For 35 years on Wall Street, Mr. Gutman is regarded as one of the market's noted interpretative writers.

Economic Trouble?

So, a diving market does not necessarily signal a coming economic storm. But a real collapse in the market can have real repercussions in industry, pave the way for a business curb. For this reason, industrialists should pay strict attention to stock market trends.

In the opinion of the author, the recent downtrend of the market is this time a true signal of economic trouble brewing. It may take years for this forecast to be substantiated—so don't expect your orders to be cancelled tomorrow. Business could be good for quite a while and still the market may be doing an accurate forecasting job—in the long-term sense.

Main direction of the market's movement could or could not prove prophetic. You have to add other facts to its rise or fall to decide. The market is only one of a number of business indicators. From 1946 to 1949 the author discounted fears of its gyrations as baseless—and was proven right.

Few people outside of Wall Street understand that prices can go up or down decisively for either of two reasons—intensity of buying desire or the lack of it. In 1929 and 1937 the market crashed because of huge liquidation. In the intense desire to get out, millions of shares poured forth day after day.

This year the market has declined because of lack of bids. Despite marvelous first half profits reports, there is no broad enthusiasm to own stocks. Thus relatively minor worries about business have brought out enough stock to depress prices.

What are some of the reasons the stock buyer is losing interest? Some of the important ones may be cured by a change in tax laws. Here is a statement of a business friend:

"I would rather put my money in some project of my own. For one thing, if I have a business I can put a lot of things on the expense account. If I buy $100,000 worth of U. S. Steel or other stock I can't even charge off my reading glasses."

Buying Power Limited

Stocks have been going down, not because they aren't worth more, but because money-making men know still better ways to use their capital. Another factor, which is not adequately appreciated, is the lack of large numbers of rich people. Latest detailed breakdown of individual incomes (1949) shows that less than 100,000 out of 51 million reporting taxpayers had adjusted gross incomes of $40,000 or over. Average net after taxes was $38,000. When you figure it out, even these rich people are not able to put huge sums into stocks each year.

"There's more going on in research than meets the eye."

Below them are about 1 million with incomes before taxes of $10,000, or better, and after that the huge mass who don't have the pocketbook to take much interest in stocks. When you allow for insurance premiums, mortgage payments, living costs, and enterprises which have a better payoff than stock ownership, it is not surprising the market has been having a hard time. In short, the market has been acting badly because of *numerous special factors not related to general business.*

The Ebb of Spirit

Although this scores a point against the idea the market points to some sort of business trouble in the future, other signs are abundant. Falling commodity prices, a weak second-hand automobile market, shifting international relations, rebirth of European and Asiatic competition, rising consumer debts, the desire of the Government to balance its budget—all indicate deflation.

There are good signs also—new peaks in employment, high national and personal income reflect the terrific momentum of our prosperity. The fall in commodity prices also has its good aspects—in many cases inventory values are now at saner price levels.

These are pros and cons and you can argue them however you like. But what disturbs the author most is the general pattern of decline in the fighting spirit of the world. Events since the war have robbed millions of their hope. International apathy can be seriously felt in the economy of the Free World.

While the apathy of the stock market now stems from different reasons, it may eventually fit into the pattern of decline.

STEEL: Overhaul Awaits Demand Slowup

Steel plant maintenance chiefs will overhaul equipment as soon as demand permits . . . Pushed to limit, mills ripe for maintenance . . . Use vacation periods—By J. B. Delaney.

There will be no weeping by steel mill maintenance chiefs over prospects of a reduced ingot rate in fourth quarter.

The men responsible for keeping mill machinery in good working order will welcome the opportunity to do a thorough overhaul of equipment that might be taken out of production should sales order books lose some of their fat.

In good times such as the steel mills have been enjoying during the last decade, maintenance men have been living a frustrated existence. Due to the urgency of steel demand some mills have used equipment to the near-breaking point, with only emergency repairs to head off a complete breakdown.

As a result, considerable maintenance in the mills is long overdue. As supply and demand come into balance, steel companies will give the go-ahead for needed repairs and rehabilitation.

Paradoxically, several steel companies are likely to reduce their "maintenance" forces in the near future and at the same time have more men available for actual maintenance.

These companies have been using maintenance personnel for construction work during modernization and expansion to avoid possible conflict between CIO and AFL workers. With the tapering off of construction work, these crews will be reduced. Workers kept on the payroll will devote more of their time to normal mill repair and rehabilitation.

With some exceptions, the job is not likely to reach spectacular proportions. Several mills have indicated they plan extensive renovation work this fall and winter, but for the most part the work will be done gradually as more "down" time becomes available.

One limiting factor is the expansion and modernization program of the steel industry which has done away with a lot of older equipment that placed a premium on close maintenance. Newer mills and machines, better built and longer-lasting, are designed to operate with a minimum of maintenance.

Use Vacation Time

Thus far, mills generally have given no indication they have mapped anything like extensive plans for maintenance. A manufacturer of electrical equipment for mills and machinery reports that orders for renewal parts, in-plant shop repairs, and field repairs are running high for industry generally, but nothing unusual is in the making as far as steel industry customers are concerned.

Several mills have utilized the vacation period to complete unusual repair jobs for this year: U. S. Steel Corp. and Sharon Steel Corp. are examples.

Faced with the prospect of staggering worker vacations or shutting down finishing equipment in need of repairs, U. S. Steel took the latter alternative and put the mills in good working order. Consequently, maintenance this fall and winter is likely to taper off.

Sharon's Thorough Job

U. S. Steel recently renovated a slabbing mill in the Chicago area and has completed work on open-hearth, bessemer and electric furnace repairs in that district. Some primary mill repairs probably will be scheduled for later this year.

Sharon Steel last July closed up for a 2-week vacation period and used the time to do a thorough maintenance job. This company expects maintenance downtime for balance of the year will be kept to a minimum.

Two McLouth Steel Corp. plants at Trenton and Detroit, Mich., took advantage of summer vacation shutdowns for overhaul.

—Steelmaking

IRON, STEEL: July Output By Districts

As Reported to the American Iron and Steel Institute

BLAST FURNACE —NET TONS DISTRICTS	Annual Capacity	PIG IRON July	PIG IRON Year to Date	FERROMANG., SPIEGEL & SILVERY IRON July	FERROMANG., SPIEGEL & SILVERY IRON Year to Date	TOTAL July	TOTAL Year to Date	TOTAL Pct of Capacity July	TOTAL Pct of Capacity Year to Date
Eastern	16,312,990	1,320,752	8,564,789	29,101	194,150	1,349,853	8,758,939	97.6	92.4
Pitts.-Yngstn.	28,643,120	2,256,894	16,072,490	34,839	242,421	2,291,733	16,314,911	94.4	98.0
Cleve.-Detroit	8,633,800	736,053	4,945,874	.....	.....	736,053	4,945,874	100.6	98.6
Chicago	16,251,250	1,323,540	9,154,464	3,620	9,399	1,327,160	9,163,863	96.3	97.1
Southern	6,020,380	469,715	3,308,812	12,582	52,818	482,297	3,361,630	94.5	96.1
Western	3,518,700	329,391	2,284,819	.....	.....	329,391	2,284,819	110.4	111.8
TOTAL	79,380,240	6,436,345	44,331,248	80,142	498,788	6,516,487	44,830,036	96.8	97.2

STEEL —NET TONS DISTRICTS	Annual Capacity	TOTAL STEEL* July	TOTAL STEEL* Year to Date	TOTAL STEEL* Pct of Capacity July	TOTAL STEEL* Pct of Capacity Year to Date	ALLOY STEEL July	ALLOY STEEL Year to Date	HOT TOPPED CARBON INGOTS July	HOT TOPPED CARBON INGOTS Year to Date
Eastern	23,963,810	1,909,351	13,425,298	94.4	96.8	156,408	1,156,564	365,341	2,707,095
Pitts.-Yngstn.	43,621,000	3,400,303	25,118,338	92.0	99.1	524,245	3,848,198	433,902	3,192,613
Cleve.-Detroit	12,002,900	908,036	6,650,726	89.2	95.4	67,499	578,275	81,734	619,235
Chicago	24,960,600	1,981,012	14,533,134	93.6	100.4	131,021	1,066,974	322,699	2,246,729
Southern	6,036,160	493,382	3,367,355	97.4	96.0	4,547	34,878	7,039	34,876
Western	7,053,000	578,583	4,106,758	96.6	100.1	10,696	93,192	23,641	184,732
TOTAL	117,547,470	9,275,673	67,221,609	93.1	98.4	894,416	6,778,081	1,234,356	8,985,281

* Includes Alloy Steel, Hot Topped Carbon Ingots.

NEW USES: Can Boom Metal Market

Demand for any metal can soar even in declining period—if new applications catch on . . . Aluminum is prime example . . . Aggressive marketing does it—By R. L. Hatschek.

Metals demand, in general, rides up and down with the graph of industrial activity. But the pattern for any individual metal can get a substantial boost even in a declining period by new products or new applications. Sometimes the boost is at the expense of another material, sometimes it isn't.

"Newer" metals in particular seem to exhibit this tendency though the older ones are not to be excluded. Increasing demand for lead as a shielding material in atomic energy work is a prime example.

Marketing Matters

Staggering growth of the aluminum industry since World War II shows how far a metal can go. Magnesium seems not too far behind. And on the horizon are many good looking prospects for metals like titanium, zirconium, tantalum and others.

In some cases unique properties are responsible for new demands. But in others aggressive marketing and selling programs are the roots. Deciding factor where more than one material may be used is almost invariably a comparative economic study.

Aluminum, with its light weight, good appearance and high corrosion resistance offers many examples of new products and new applications. Heading the list of new consumer products is the metal's outstanding success story—foil.

Acceptance Spreads

This product had very limited uses only a few years ago. And today it's a familiar household item. Much progress has been made in marketing foil as a packaging material and industrial uses are by no means minor.

And successful marketing of aluminum foil as a consumer product has led to greater public acceptance of other products made of aluminum, producers claim. In an attempt to further capitalize on this, Reynolds Metals Co. has recently introduced a new consumer product in a limited test area. It's "Reynolds Home Aluminum."

Lead to New Products?

This product is a soft alloy, available in sheet, foil, rod, bar, tubing and angle, designed for use by the home craftsman. It can be cut and formed with hand or power tools ordinarily used for woodworking. Nationwide introduction is slated for this fall.

Advantage is being taken of the growing American trend to "do it yourself." The firm is publishing a booklet showing how various articles may be made and giving several suggestions for other home workshop projects.

While not a heavy tonnage product, it will put more objects made of aluminum into the consumer's home. This should give still another boost to public acceptance. Another beneficial result is expected to be found in the ingenuity of the home craftsman. Some of his ideas may well result in new products for industry to manufacture.

Ask for Ideas

Another newcomer to the American scene is the aluminum highway sign, which is being adopted by New York State as well as several others. In this application the aluminum will be largely covered by Minnesota Mining & Mfg. Co.'s "Scotchlite" reflective sheeting which adheres very well to aluminum.

Aluminum curtain wall construction (THE IRON AGE, Aug. 13, p. 84) has been called the "biggest thing in architecture today." Aluminum nails are catching on for special applications (See THE IRON AGE, Aug. 6, p. 79). Furniture, light poles, scaffolding, lamp bulb bases, building hardware, farm and industrial roofing are all relatively new uses for aluminum.

POINTING TO THE CLOUDS is Pittsburgh's new Alcoa Building, completely sheathed in aluminum panels. Interior also sports a great deal of the light metal.

Brooks & Perkins, Inc., recently distributed a questionnaire asking for possible new applications for magnesium plate. This metal, younger than aluminum, has already dented several markets. Many uses have been found in materials handling where magnesium's light weight pays.

But with the starting of Brooks & Perkins' new plate mill and the resulting reduction in plate prices, the firm is seeking new markets for plate. Response was reported to be excellent with over 300 suggestions coming in.

In almost all cases the ideas took advantage of magnesium's lightness to reduce power requirements, cut worker fatigue or increase the speed of machinery. Avoiding the more obvious aircraft applications, some of the suggestions were: Freight elevator flooring, production jigs and fixtures, ore-hoisting skip cars, drill and router templates, tractor parts, scaffolds and walk boards, large

What makes a champion?

CONSISTENTLY good scoring, game after game, is the attribute which sets apart the championship team from the run-of-the-mine bowling quintette.

It's much the same in our game. When you select a contracting firm to undertake responsibility for your expansion program, you require an organization which consistently does quality work—quickly and economically.

The Commercial Contracting Corporation staff is proud of its qualifications and accomplishments—of the long list of clients it has served not once, but many times.

Just as any good bowling team welcomes a chance to compete, so this seasoned industrial team welcomes the opportunity to bid on any project involving one or more of the many CCC services.

CCC services, provided individually or under one PACKAGE contract, include:

• General Construction • Building Alterations • Demolition •
• Foundations • Press Erecting • Machinery Moving •
• Crane and Conveyor Installing • Equipment Warehousing •
• Steel Fabricating • Export Packaging •

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doors, and even oars for racing shells. Some of these ideas could well develop into significant new markets for magnesium.

Of course, new industries frequently create demand for metals with unusual properties. One of these is the electronics industry; another, still in its embryonic stage, is atomic energy.

Costs Make Decision

The former places new demands for tantalum foil, with its unusual electrical properties, to be used in condensers and electron tube shields, and for germanium to be used in transistors. The latter demands non-neutron absorbing zirconium to be used for structural members and lead for shielding of harmful radiation.

ORDINARY WOOD PLANE being used to trim the edge from a piece of Reynolds' new "Home Aluminum." Cellar craftsmen can make himself a multitude of household gadgets from the soft alloy without hurting woodworking tools. Will soon be marketed nationally.

But in any case where materials may be used interchangeably, the one that's chosen is the one that does the job better, does it easier or costs less in the overall picture. Take the aluminum-Scotchlite highway signs mentioned above. They cost more initially than steel signs. But the day and night visibility is better as a result of the reflective properties of Scotchlite. And the corrosion resistance of aluminum eliminates the necessity for painting either when new or at any time thereafter, thus cutting highway maintenance costs.

LOCK NUTS: Hold Down Good Market

New orders come in at good clip despite cutbacks, softness in some goods . . . Need high volume to prosper—and volume customers are getting on board—By G. G. Carr.

Tiffanys of the fastener industry, lock nut producers are feeling pretty chipper there days. Defense cutbacks and softness in some civilian goods lines are having their effects, but orders are still coming in at a good clip and new applications are turning up with pleasing frequency.

The whole fastener industry has been booming since the shooting started in Korea. Lock nut makers were no exception. When defense contractors opened up the production throttle, demand for the high quality, high precision fasteners zoomed.

Demand Stays Strong

Elastic Stop Nut Corp. of America, for example, entered the period with substantial inventories, until recently was working two 12-hour shifts on some facilities to keep up. The heat is off, but ESNA is still humming with two 8-hour shifts still on a busy work week.

Demand is still strong, with new orders coming in at a healthy rate. The aircraft industry, largest single user of lock nuts, still has robust order backlogs. Virtual completion of the railroad diesel program has slackened demand from that field, but general railroad activity is high. And repair and modernization are tasty markets.

Oil a Good Customer

Farm equipment makers, who use substantial quantities normally, are in a seasonal slump, but should pick up in the spring. Industrial electronics devices consume good numbers of lock nuts, still have first rate sales.

The oil field equipment industry was one of the first to specify lock nuts, remains a heavy user. Current orders reflect the petroleum industry's unceasing hunt for new wells. Similarly, mining machinery makers are keeping pace with development of new ore deposits, keeping lock nut demand firm.

Most pleasant prospect for the industry is the development of new applications for its products. Fasteners of any type require high volume to prosper. List of using industries is varied, but many to date have been low volume fields like machine tools and textile and printing machinery.

But more high volume customers are buying. Business with appliance makers is on the upswing, particularly for air conditioners. The earth moving machinery field, in itself expanding, is showing a growing interest in lock nuts.

Automotive use is increasing, but cost-conscious Detroit is still hesitant about the higher-price reusable nuts, even in the face of admitted better performance. But needs of newer and more complex units, like automatic transmissions, should speed acceptance.

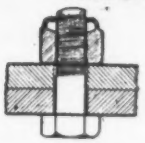
Great advantage of lock nuts is that they stay put. Producers are looking greedily at the packaging and shipping fields, hope for increased use of lock nuts to secure goods in transit. In a recent shipment of turbine generator equipment from the Midwest to the West Coast, the only load out of ten to survive the rail trip unscathed had been secured by lock nuts.

Not Just Cost

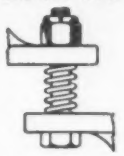
Atomic energy installations have been good customers, but it's a little hard for lock nut makers to make plans in this field since they frequently don't know how their products are being used. ESNA is still wondering just exactly what AEC did with those silver plated nuts.

Lock nut makers admit they can't compete with conventional fasteners on unit cost. Speedier installation, better performance and greater accuracy, higher safety factor, longer life and all-in-one construction are some of their chief talking points.

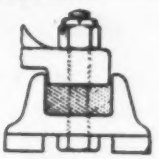
Recommended Lock Nut Applications



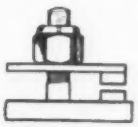
Wherever a vibration-proof bolted connection is desired.



For spring-mounted connections where the nut must stay put or is subject to adjustment.

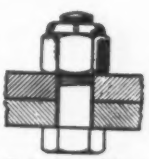


For rubber-insulated and cushion mountings where the nut must not work up or down.



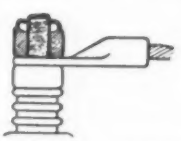
On make and break adjustment studs where accurate contact gaps are required.

Where elimination of leakage past stud threads is necessary.



Where it is desirable to protect bolt or stud threads from corroding elements.

For bolted connections requiring pre-determined play.



On all electrical terminals subjected to vibration in transit or operation.

RAILROADS: See Small Freight Dip

Traffic depends on general industrial activity . . . Higher freight rate demands could result if labor wins big hikes . . . Car builders have 8-month backlog—By G. H. Baker.

Volume of freight traffic moving over the nation's railroads in the last four months of this year probably will be a bit under that moved in the last four months of 1952—but not much. What the volume will be next year is anybody's guess. Since railroad freight business depends directly upon the volume of activity in the manufacturing industries, rail spokesmen are reluctant to hazard predictions.

A healthy level of production in the manufacturing industries will, of course, provide the railroads with plenty of customers. Some top rail officials believe next year's general level of production will be slightly less than this year.

Equipment Backlogs Drop

In 1952 the railroads moved about 615 billion ton-miles of freight. This year they'll total something just over 600 billion ton-miles. Says one official: "Next year, I'd say we will be doing well if we can hold total freight volume to around 600 billion ton-miles."

Backlog of rail equipment orders has been substantially cut in recent months and this causes some concern among railroad suppliers. Orders for new cars and locomotives are a little slow in coming in. One reason for this is that the railroads want to make sure the present rates will stay in effect before they commit themselves to buying new equipment. Interstate Commerce Commission recently turned down a railroad request that existing temporary rates be made permanent. Instead ICC extended the present temporary rates in effect through 1955.

Earnings Are Good

Almost all rail rolling stock today is bought on a time basis. The roads pay ten or 15 pct down, and the rest over a period of years. They cannot commit themselves years ahead without some assurance of rates that will net them a fair return, thereby permitting them to keep on buying new equipment. So management is reluctant to expand its equipment program too far ahead.

But overall rail earnings are fairly good today, so the roads will keep on buying to the extent of their earnings. The freight car production goal has not been reached. In 1950, the roads owned 1,725,000 cars while the goal for that year was 1,850,000 cars.

About 7000 new cars each month are going into service, well above retirement of old cars. In July, 1953, 6370 new cars went into service, bringing the total number for this year to 42,000. The roads have been adding cars at the rate of 75,000 per year and, if earnings hold up, they expect to continue that rate.

Dieselization Slows

As of August 1, cars on order totaled 47,423, enough to keep car-builders busy for the next eight months. And new orders are coming in every week. Next year deliveries of new cars probably will continue at a slightly lower rate—about 6000 cars per month. Retirement of old cars will continue, but there will still be a net gain each month.

Dieselization is tapering off since most of the roads are nearing completion of their programs. Diesels are now in service in more than 70 pct of all operations. Steam and electric locomotives will continue in operation indefinitely in some situations where Diesels are not practical, and some orders for steam and electric locomotives will be placed from time to time. There will always be a small margin for steam and electric locomotives.

Labor Talks On

Whether the railroads will ask for higher freight rates at any time soon depends in large part on the outcome of labor negotiations now getting under way. Present labor contracts, in effect for the past three years, expire in October.

Some rail officials expect to put up a stiff fight to hold down demands for increases in wages and fringe benefits. Labor has not yet officially specified its demands. If they're considered "reasonable" by rail management, higher rates won't be necessary. But, says one official: "If labor stings us, we will have to ask the ICC for higher rates."

As for the commodities and products that railroads buy, the outlook is for further stabilization of prices. Actually, prices charged

How Freight Car Loadings Stack Up

	1953	1952	1951
Jan. (5 weeks)	3,352,053	3,561,719	3,660,523
Feb. (4 weeks)	2,730,852	2,911,090	2,834,472
Mar. (4 weeks)	2,801,603	2,867,583	2,998,963
Apr. (4 weeks)	2,957,088	2,912,199	3,152,196
May (5 weeks)	3,883,088	3,677,596	3,977,393
June (4 weeks)	3,203,942	2,605,738	3,294,766
July (4 weeks)	2,963,805	2,236,068	2,993,321
Aug. (5 weeks)	4,022,382	3,882,069	4,120,219
Sept. (4 weeks)		3,362,882	3,311,846
Oct. (4 weeks)		3,293,697	3,478,888
Nov. (5 weeks)		4,001,022	3,976,501
Dec. (4 weeks)		2,671,440	2,700,094
TOTAL	25,914,813*	37,983,103	40,499,182

* 8 Months

Source: Assn. of American Railroads

the roads have changed little since January, and there are no current indications of rising prices. But the roads don't expect any drop in prices of things they buy because of high labor costs in the manufacturing industries and in coal. Even if a period of mild deflation lies ahead the roads do not expect to benefit much by lower prices because labor cost is a very important factor.

Construction

Building:

August commercial building expenditures hit new high.

Record levels for new construction expenditures are continuing, with outlays for commercial building showing a more-than-seasonal upswing.

Investment in all types of new construction totaled slightly more than $3.3 billion in August, preliminary government estimates show. Increase was about 7 pct above August 1952.

For the first 8 months of this year new building outlays added up to nearly $22.7 billion, about 8 pct above the total for the same months last year. Physical volume was also up somewhat from the January-August period of 1952.

Home Building Dips

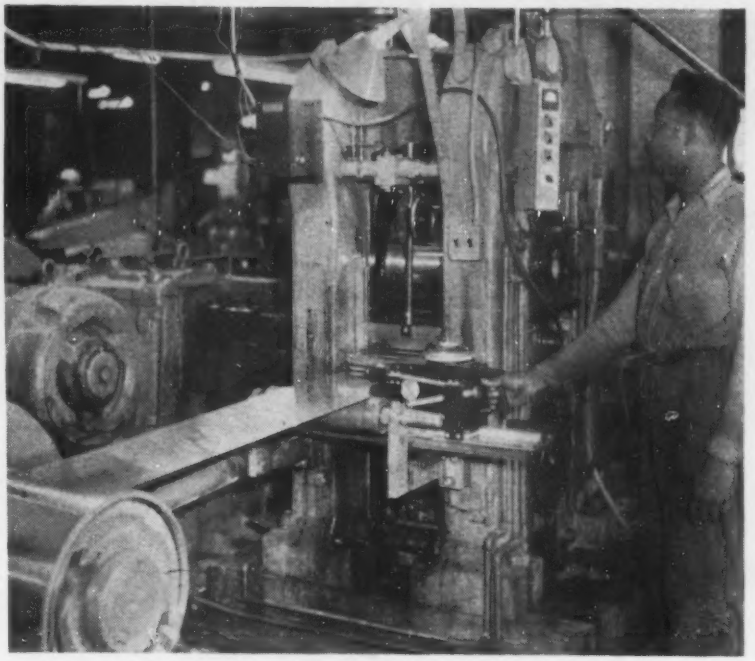
Weakest point in the building program in the past 2 months has been the investment in private housing, which declined for the second successive month.

Private spending for industrial building leveled off, after a steady slide since early spring. Gains in road building and in privately-owned public utilities were in line with seasonal trends.

Outlays for military and naval installations and for public industrial facilities amounted to $126 million and $172 million, respectively, in both July and August.

Private expenditures in August totaled $2.2 billion, and public, $1.1 billion. In each case, July totals were exceeded.

Machinery



MAGNETIC GAGE is moved into place over strip as worker watches indicator continuously showing variations of 0.0001 in. Oblong box at his right contains tension controls and switch operating four-high mill.

Electrons Run Rolling Mill

Catering to manufacturers who demand tolerances far beyond mill standards, Eastern Brass & Copper Co. was faced with the problem of increasing precision on production rolling jobs. Solution is a tribute to electronics.

Greater strip tension, with automatic regulation, plus continuous accurate gaging of the coil was needed on the four-high mill installed in the firm's New York City warehouse.

Eastern Brass and Westinghouse Electric Co. engineers put their heads together and came up with a design based on an electronic system. The three basic components are a tension block, a series of electronic controls and a continuous magnetic gage.

The block permits constant tension of up to 2000 psi and, by increasing the pull on the material, substantially eliminates ripples and camber. The electronic controls guarantee uniformity by regulating the tension as the coil of metal builds up. The magnetic gage, specifically designed for rolling mill operations by Pratt & Whitney, continuously measures to 0.0001 in. accuracy.

Working together, this combination assures tolerances of ± 0.0003 in. in steel, brass, copper and aluminum strip up to $12\frac{1}{2}$ in. wide which is rolled on this mill.

The firm, a warehouse which has found that precision processing pays off handsomely, is also equipped with two-high mills, a controlled atmosphere annealing furnace, shears, round-edgers, cut-to-length machines, a roller and patent leveling machine and a battery of eight gang slitters.

Most of these have been modified to increase precision in Eastern's machine shop. And some of the machines have been built practically from the ground up by the firm.

Yes, you can make one false note and be all washed up . . . with the name you've spent years building, quickly consigned to oblivion. We at Kester know the importance of consistency . . . make sure that the solder alloy and especially the flux formula never varies, never changes. Kester never experiments at the expense of the solder user!

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PLANES: Why They

Inflation, improvements, short runs have more than tripled cost since 1941.

Since World War II, the aircraft industry has made tremendous strides. Bombers now being turned out can score direct hits from 10 miles above an unseen target. They can fly twice as fast and carry twice the bomb load of their World War II counterparts. Late model fighter planes can hit 700 mph compared with 400 mph in the last war.

These improvements, in addition to the many other advances such as heavier firepower, improved controls, have been extremely costly. But in a booklet published last week, Aircraft Industries Assn. of America cites the industry's efforts to make every dollar spent on air power count.

Why They Cost More

Rise in the cost of manufacturing planes during the last 12 years has been startling. A World War II fighter plane cost $58,000, but those used in Korea are more than four times as costly ($233,000). The bombers that flew over Berlin were priced at $660,000. Now it takes $2 million to produce a bomber.

Reason for the increased cost is of course not solely due to the changes needed to make these planes more effective. Inflation is the largest single factor, as even a 1941 model would cost twice as much to manufacture now.

Design Changes Are Costly

Also forcing up the cost per plane is the difference in the number and the types of orders placed. From 1940 to 1945, the aircraft industry made 300,000 military planes. During the 1947-1952 period only 23,000 were turned out. World War II orders were for thousands of planes of one type, while current procurement orders are for hundreds or less.

And the old bugaboo of design changes is another factor pushing

Cost So Much

How Aircraft Dollar Is Spent

PROTOTYPE STAGE

Engineering	36¢
Factory Overhead	31¢
Labor	17¢
Tooling	13¢
Materials	3¢

PRODUCTION STAGE

Engineering	3¢
Factory Overhead	37¢
Labor	23¢
Tooling	9¢
Materials	28¢

Aircraft Industries Assn. figures.

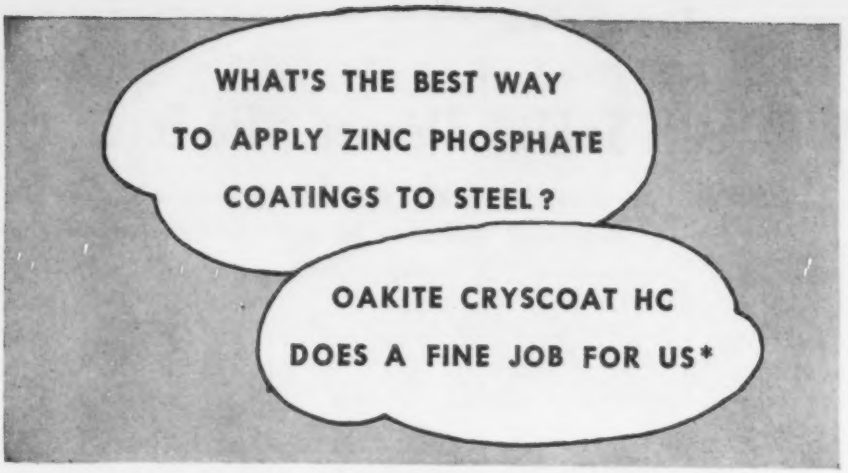
prices up. AIA states that on one type of aircraft technological advances required an average of six design changes every day while the plane was in production. All these production interruptions added to manufacturing costs.

How The Money's Spent

Of particular interest in the new booklet is a breakdown of aircraft production costs, (see box). In the early stages of production when only a few prototype models are turned out, engineering costs are the largest single expense, accounting for 36 pct of total outlay. During the actual production run this cost nosedives to 3 pct and is the least important. Factory overhead (rent, utilities, maintenance, taxes, administrative costs are the major expense, amounting to 37 pct of total cost. Materials are the next most important at 28 pct.

Cut Cost 25 Pct

In outlining the cost cutting innovations the industry has made in production, management, and engineering techniques, AIA states that no single factor contributes more to defense economy than the elimination of stop-and-go production by long range planning. It backs up this statement by pointing out that the President's Air Policy Commission estimated that a long range procurement program would reduce the cost of air power 20 to 25 pct.



*This comment came from a Pennsylvania munitions maker, who added that Oakite CrysCoat HC has put an excellent zinc phosphate coating on 385,000 shells with "absolutely no trouble... maintenance and control are very easy."

The Oakite CrysCoat HC coating on steel products—such as artillery shells, rocket fins, auto parts, etc.—weighs more than 200 milligrams per square foot. It more than meets the requirements of U.S. Government Specifications:

JAN-C-490, Grade 1 **57-O-2C, Type 2, Class C**
PA-PD-191, Rev. A

The Oakite CrysCoat HC Process for preparing steel for painting—either in spray-washing machines or in tanks—has five big advantages:

1 The heavy CrysCoat HC coating forms a strong foundation for the lasting adhesion of paint. *See page 5 in free booklet.*

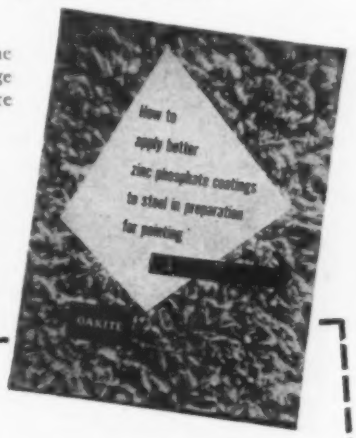
2 The heavy coating gives excellent protection against electrochemical corrosion. *See page 7.*

3 The CrysCoat HC Process is easy to control. Only one material is used for make-up and up-keep. No accelerators, starters, toners or other additives are needed. Only one simple type of titration is used. *See page 9.*

4 The CrysCoat HC reaction produces relatively little sludge and scale. *See page 10.*

5 Stainless steel is not necessary for all parts of the equipment. *See page 11.*

FREE For complete information, mail the coupon for a copy of our 12-page illustrated booklet describing the Oakite CrysCoat HC Process.



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WRITEOFFS: Flow Thinned, Not Ended

Government plans cutback in tax benefits program . . . Plan not being abandoned . . . May be used to lure industry to labor surplus areas . . . Many goals hit—By *R. M. Stroupe.*

Final days of the federal fast tax writeoff program are not yet here, even though the government is planning to thin the flow of Certificates of Necessity to defense plant expansion projects.

Defense Mobilizer Arthur S. Flemming said last week there would be a cutback in the present application of the tax benefits program, but he made it clear the policies under which the benefits are granted are not being abandoned.

May Extend Benefits

At this time, there are at least two possibilities for opening the way to renewed life for a reduced writeoff operation. One which Mr. Flemming said he is considering is to offer rapid amortization as an inducement to industrial firms to move into labor surplus areas. At present there is no federal policy for creating new business in such areas, now numbering 26.

A second possibility, though it cannot become a reality before Congress meets again, involves enactment of legislation offered by Sen. Homer E Capehart, R., Ind., to extend rapid tax writeoff benefits to all categories of industrial expansion as a means of stimulating overall production. Mr. Flemming has not defined his attitude toward this measure.

Some Oppose Program

Under the stimulus of an upswing in defense preparedness efforts, the government opened its tax amortization program activities in mid-1950. It was designed to encourage expanded production in defense and defense-supporting fields by allowing a percentage of the construction costs of new facilities to be written off in 5 years, rather than the customary 20 to 25 years.

Some opposition to the program has been raised from time to time by tax "experts" who assert that the Treasury has lost tax revenue because of the scheme. It has been pointed out, however, that creating interest in the buying of new productive equipment has helped equipment producers to raise their output and profits, thus boosting the value of taxable corporate income.

Reach Many Goals

Since the program began, the government has authorized rapid amortization for about 60 pct of almost $28 billion in costs connected with nearly 18,000 industrial expansion projects. Industries affected range from the metal ores to the jigs and fixtures fields.

Basis for this activity lies in the 233 production expansion goals set by the government. According to Mr. Flemming, A "large percentage" of these goals will be closed, on the grounds that targets have been reached or goals are sufficiently near completion to provide an adequate margin of production.

Just which goals are due for closing had not been decided last week. Mr. Flemming intends to get the views of other agencies affected by the program before he is ready to say where the list will be cut.

A spot check among certain industries provides some indications of points where trimming may occur. For example, the production goal for the cement industry was announced in 1952 (THE IRON AGE, Mar. 27, 1952, P. 68) as "more than 267.5 million bbl" by the end of 1953.

Iron 90 Pct Underway

Outlook now is for possible shipment of 250 million bbl of cement this year, with about 20 million bbl to remain in producers stocks. Therefore, it is possible one of the goals to be eliminated is that for the cement industry.

An early goal for the blast furnace field called for 85 million net tons of pig iron and castings capacity by the beginning of 1954. Last Spring, the goal was increased to 87 million tons, with Jan. 1, 1955, as the target date.

On Jan. 1 of this year, productive capacity was given as 78.25 million tons, but the Joint Committee on Defense Production in Congress said later that the expansion program in this industry was "90 pct or more under way" as of last Mar. 26.

Also commented on by Mr. Flemming last week was the still-pending decision on third-round aluminum production expansion. He acknowledged that Olin Industries, Inc., East Alton, Ill., and the Wheland Co., Chattanooga, Tenn., must be viewed as still in the running.

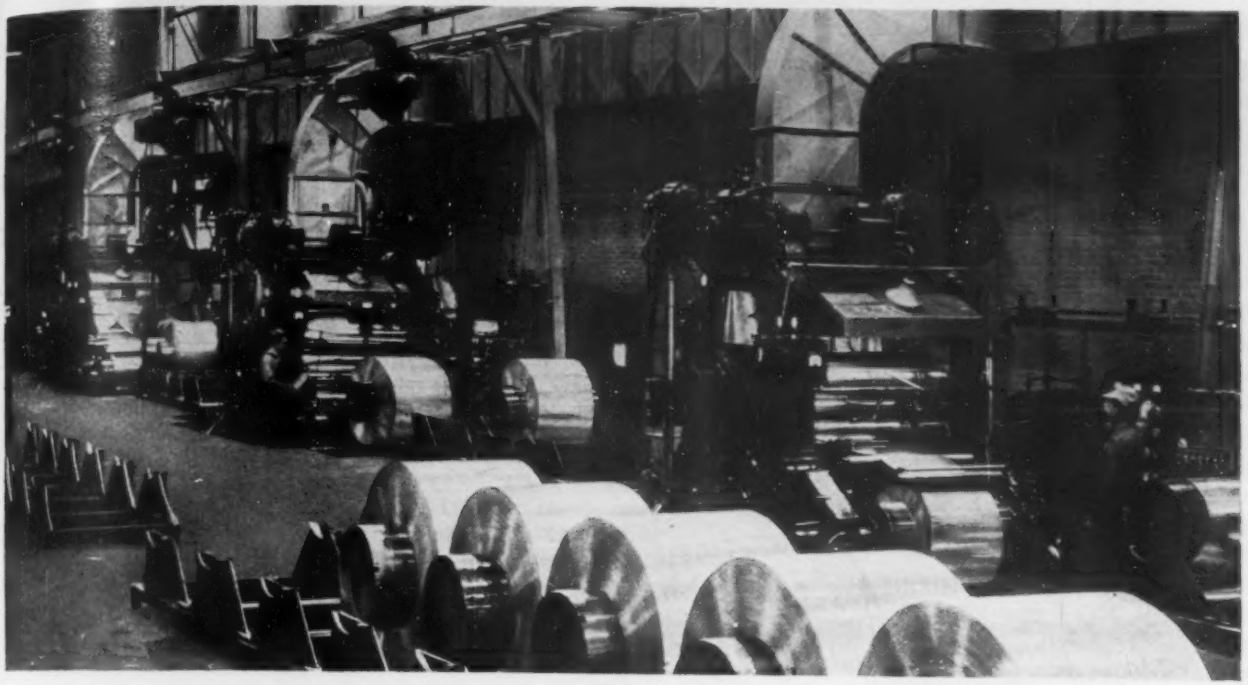
Fabricated Structural Steel

Contracts, Shipments, Backlog

Estimated Net Tons

	1953	1952	Avg. 1947-50
CONTRACTS CLOSED			
July	213,638	221,559	229,334
Year to Date	1,768,956	1,478,381	1,315,699
SHIPMENTS			
July	222,016	138,267	183,329
Year to Date	1,782,486	1,498,830	1,286,844
BACKLOG	2,133,517	2,361,027	1,251,315

Source: American Institute of Steel Construction



ALUMINUM FOIL REDUCTION pass operation at plant of Reynolds Metals Co.

How Aluminum Foil Is Made

Household aluminum foil is a familiar sight in every one's kitchen. It's easy to use, too—but it isn't so easy to make. Here Reynolds Metals Co. gives us a peek into one of its foil rolling plants.

Raw material is sheet aluminum. This is given several reductions and finishing passes, the number of which depends on final specifications. In many cases the later operations are done on two layers at once. This produces the dull side on 0.0007-in. thick household foil. Highly polished rolls result in the good finish on the other side.

WOMEN WORKERS operate foil slitting machines.

INTERMEDIATE spooling is done after trimming.

REMOVAL of finished, evened spool is the next step.

INDUSTRIAL FOIL is sorted prior to shipping to consumers.

PRINTING of Gift Wrap at Harrison, N. J., plant.

Spending:

Military hard goods cost U. S. $23.3 billion in fiscal '53.

Defense contractors agreed in fiscal 1953 to supply the Army, Navy, and Air Force with $28.6 billion worth of major equipment and supplies, military construction, and expansion of military production facilities.

This total includes both contracts with private industry and project orders placed with Defense Dept. industrial establishments, such as arsenals and shipyards.

The Air Force obligated $14.2 billion, the Navy $7.8 billion, and the Army $6.5 billion. Interdepartmental construction accounted for $0.1 billion.

Procurement of hard goods (aircraft, ships, tanks, weapons, ammo, production equipment, electronics, and other equipment) accounted for $23.3 billion of the total. Soft goods (clothing, subsistence, and petroleum) totaled $3 billion, and construction $2.3 billion. Obligations for military assistance programs accounted for $2.1 billion of the hard goods.

Military pay and allowances, research and development, and other activities brought total Defense Dept. obligations for the fiscal year to about $46.5 billion.

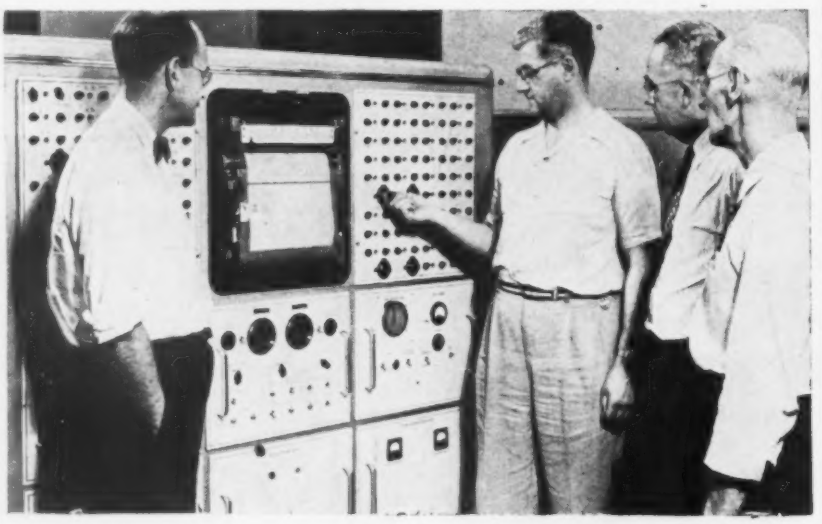
$12 Billion Left Over

Nearly $12 billion remained unobligated, as of June 30. Of this, $11 billion will be available in the current fiscal year. The balance—around $0.8 billion—will expire.

In the current fiscal year, Defense Dept. will have available to it about $47 billion in new obligational authority, plus the $11 billion carryover. Of the $47 billion in new money, $29.1 billion is for procurement and construction ($23.2 billion for hard goods, $3.1 billion for soft goods, and $2.8 billion for construction).

In the 3 years following the outbreak of the Korean war, a total of $170.5 billion in obligational authority was made available to the Defense Dept. Actual obligations totaled $158 billion.

Testing



Crucible Steel Co. of America has put the Quantometer back to work analyzing production heats of specialty steels at its Syracuse, N. Y. and Midland, Pa., plants. The Quantometer reduces chemical analysis time to approximately 10 minutes, giving the melt shop better production control and improved heat uniformity.

The Crucible instruments were built by Applied Research Laboratories of Glendale, Calif.

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Snow plow, 90 ea, $65,610, Oshkosh Motor Truck Inc., Oshkosh, Wis.

Cups, bullet, jacket, 300000, $163,800, American Brass Co., Waterbury, Conn.

Bearing, ball, 51400 ea, $70,976, Banner Mfg. Co., Inc., Brooklyn.

Bearing ball, 73650 ea, $128,657, Marlin-Rockwell Corp., Jamestown, N. Y.

Bearing, roller, tapered, 16200 ea, $57,376, Tyson Bearing Co., Massillon, Ohio.

Clamp, wire rope, 66000 ea, $180,120, National Sale Line Clamp Co., Roseville, Mich.

Bearing, ball, 90800 ea, $53,592, Marlin-Rockwell Corp., Jamestown, N. Y.

Cone-tapered roller bearing, 15100 ea, $57,528, Tyson Bearing Co., Massillon, Ohio.

Bearing, ball, 52000 ea, $56,230, Marlin-Rockwell Corp., Jamestown, N. Y.

Bearing, ball, 38652 ea, $70,409, Marlin-Rockwell Corp., Jamestown, N. Y.

Bearing, ball, 99604 ea, $164,791, Marlin-Rockwell Corp., Jamestown, N. Y.

Bearing, ball, 50000 ea, $104,500, Bearings Co. of American, Lancaster, Pa.

Bearing, ball, 67590 ea, $137,987, General Motors Corp., Bristol, Conn., *L. A. Lanning.*

Socket, coupling, 55002 ea, $119,113, Facs Products Inc., Chicago.

Bearing, ball, 77000 ea, $73,845, Bearings Co. of American, Lancaster, Pa.

Bearing, ball, 94000 ea, $101,426, Bearings Co. of American, Lancaster, Pa.

Maintenance parts for SNJ aircraft, var, $241,378, North American Aviation, Inc., Columbus, Ohio, *C. E. Bloomer.*

Bracket and drum assy, drive and motor assy, var, $96,095, Sperry Gyroscope Co., Great Neck, N. Y., *George A. Dennis.*

Spare parts for J48-P-5 engines, var, $142,652, Holley Carburetor Co., Detroit, *N. Dann.*

Maintenance parts, var, $80,869, Continental Aviation & Engineering Corp., Detroit.

Wheel assy, 619 ea, $104,611, The Goodyear Tire & Rubber Co., Akron.

Fuel pumps, 1680 ea, $2,367,238, Bendix Aviation Corp., South Bend, Ind., *G. I. Lyman.*

Spare parts, var, $60,210, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Spare parts, var, $183,873, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Spare parts, var, $638,908, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Washers, linkroad assy, var, $739,588, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Spare parts for HSD propellers, var, $60,381, United Aircraft Corp., Windsor Locks, Conn., *Adam C. Wolz.*

Spare parts, var, $126,066, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Maintenance parts for HSD propellers, var, $271,258, United Aircraft Corp., Windsor Locks, Conn., *Adam C. Wolz.*

Spare parts used on propeller assy, var, $110,311, United Aircraft Corp., Windsor Locks, Conn., *Adam C. Wolz.*

Can, steel, 65853 ea, $147,789, The Cincinnati Galvanizing Co., Cincinnati.

Laundry drying tumbler, 72, $68,165, Hammond Laundry Cleaning Machine Co., Waco, Texas.

Metal parts for cartridge, photoflash, 122 units, $97,870, Reynolds Metals Co., Louisville, Ky.

Firing cutout assys, 60 ea, $61,861, The Emerson Electric Mfg. Co., St. Louis.

Gun cameras, 1970 ea, $643,210, Bell & Howell Co., Chicago.

Inverters, 1000 ea, $690,944, Bendix Aviation Corp., Eatontown, N. J.

Diesel units, 62 ea, $820,625, Caterpillar Tractor Co., Peoria, Ill.

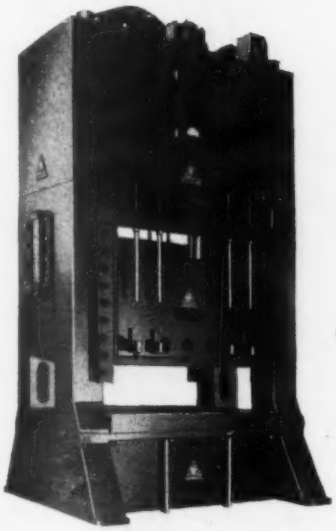
Spare parts, $2,000,000, General Electric Co., Schenectady, N. Y.

War surplus items, $367,755, Bachman Wholesale Co., Rochester, N. Y.

Radio receiver, 4000 ea, $290,859, Remler Co., Ltd., San Francisco.

Base plate assy, 7000 ea, $647,438, East Moline Metal Products Co., East Moline, Ill.

Do Caterpillars Know?



The coat coloring of the "woolly bear" predicts the mildness or severity of the coming winter, folklore experts believe. But this furry caterpillar wisely spends his winter in a snug cocoon, cozily unconcerned about folks who believe his prediction.

Time-worn ideas like this one often cling in spite of the cold analysis of modern science. Adherence to traditional methods continues to hamper Industry. Failure to use modern press equipment in product manufacture because certain parts have always been cast or cut from solid is a case in point.

Why not take a closer look at your manufacturing methods now? In addition to greater production economy, modern press methods often bring attendant benefits like faster assembly and improved product appearance. We'd like to show you how this can be done. Call on Clearing Machine Corporation.

CLEARING MACHINE CORPORATION

6499 WEST 65TH STREET • CHICAGO 38, ILLINOIS

HAMILTON DIVISION, HAMILTON, OHIO

CLEARING PRESSES THE WAY TO EFFICIENT MASS PRODUCTION

Announcing

THE
ARMS-FRANKLIN
Weld-a-matic
COIL SPLICER*

for CARBON STRIP • SILICON
STAINLESS • ALUMINUM
COPPER • BRASS

Increase production
Reduce down-time
Minimize scrap loss

The Arms-Franklin *Weld-a-matic* Coil Splicer offers a perfected method and equipment for end-welding coils of strip to permit true *continuous* operation of processing or fabricating lines or, more nearly continuous operation of cold reducing mills using built-up coils.

Key features of the A-F *Weld-a-matic* include a slim, contoured weld that is stronger than the parent metal, not subject to breakage, and that does not require trimming before entering mill rolls. The process has proved successful on carbon steel, silicon steel, stainless, aluminum, copper and brass. Strip widths up to 94" are currently being end-welded satisfactorily. An installation includes reels, looper, tables and all other necessary auxiliary equipment. The A-F *Weld-a-matic* operation is fast, automatic, push button controlled and does not require special training or welding experience.

If you have a strip operation to speed up, investigate the Arms-Franklin *Weld-a-matic* Coil Splicer. Our survey of your present operation will prove that A-F *Weld-a-matic* will quickly amortize its cost in increased production alone. Ask for it.

* Patents applied for

THE **ARMS-FRANKLIN** CORP.
YOUNGSTOWN 1, OHIO

Producers of: Strip Coil Splicers, Coil Build Up Lines, Cleaning and Pickling Lines, Annealing and Inspection Lines, Slitting Lines, Grinding Lines, Cut to Length Lines, Payoff Reels, Tension Reels, Levellers, Shears, Classifiers and Other Auxiliary Equipment.

WE PUT THE "CONTINUOUS" IN CONTINUOUS MILLS

Industrial Briefs

Anniversary Meeting . . . GRAY IRON FOUNDERS' SOCIETY, INC., will hold its 25th Silver Anniversary meeting at the Hotel Jefferson, St. Louis, on Oct. 8-9.

Going Up . . . AVONDALE MARINE WAYS, INC., has a large capacity plant and facilities under construction for the manufacture of porcelain enamel architectural products, at Avondale, La.

Special Service . . . TUBE TURNS, INC., Louisville, Ky., has established a branch plant in Houston, at 7120 Katy Highway, to provide special service to the Southwest's petroleum industry.

Plans Expansion . . . BERGEN WIRE ROPE CO., Lodi, N. J., recently completed plans for expanding its facilities. Program is to include the erection of new buildings, and new servicing methods.

Bon Voyage . . . Dr. Lawrence W. Bass, left for Egypt last week where he will be administrator of the ARTHUR D. LITTLE, INC., industrialization project for that country.

Making Records . . . Production at THE COLORADO FUEL & IRON CORP.'s new Allen Mine, near Stonewall, Colo., is now at an all-time high. Approximately 40,000 tons of coal are now being produced monthly.

Name Change . . . THE RAPIDS-STANDARD CO., INC., Grand Rapids, recently incorporated under the trade name Rapistan its Cleveland, Buffalo and Grand Rapids distributors.

Elbow Room . . . KURT ORBAN CO., INC., has moved its Detroit office and service center to larger quarters at 18627 James Couzens Highway.

Michigan Plant . . .WAGNER BROTHERS EQUIPMENT CO. has acquired a production plant in Wayne, Mich., where the firm's new fully automatic electroplating machine is in production.

New Division . . . Now Affiliated with SOUTHWEST STEEL CORP., Pittsburgh, is The Continental Iron & Steel Co. It will continue operations with the same personnel under the name of The Continental Iron & Steel Co., a division of Southwest Steel Corp.

Bar Mill Furnaces . . . RUST FURNACE CO., Pittsburgh, has completed a new bar mill furnace for the Colorado Fuel & Iron Corp. at its Minnequa Works, Pueblo, Colo., and a second is under construction.

Southern Warehouse . . . WESTERN AUTO SUPPLY CO. will establish a warehouse at Birmingham to distribute its products over 14 southern states.

New Arm . . . ALLIS-CHALMERS MFG. CO., Milwaukee, has named the Halsmith Co., Decatur, Ga., a distributor in a portion of Georgia.

Scholarship Fund . . . THE CLARK EQUIPMENT CO., Buchanan, Mich., has established a $2000 scholarship fund at the Illinois Institute of Technology for students majoring in materials handling.

"Light Up" . . . Max J. Zivian, president, DETROIT STEEL CORP., gave the "light up" signal starting the company's new 1,400 ton #2 blast furnace at its Portsmouth Div., Portsmouth, Ohio, recently which will raise the nation's pig iron capacity by 500,000 tons annually.

Constructing . . . DUNN STEEL DIV., of Townsend Co. will start construction of a new plant at the firm's Plymouth, Mich., headquarters.

Coming Up . . . ASSOCIATION FOR COMPUTING MACHINERY will hold its annual meeting Sept. 9-11 at Massachusetts Institute of Technology, Cambridge, Mass.

Congrats . . . MARSHALL & HUSCHART MACHINERY CO., Chicago, is celebrating 60 years of service in the Metalworking Industry.

Expanding . . . NATIONAL CAN CORP. is expanding production facilities at its Hamilton, Ohio, plant. The first phase of the expansion program will be the purchase of completely automatic double-die press units for the production of can ends.

Appointed . . . ALLOY PRECISION CASTINGS CO., Cleveland, has appointed Industrial Products Sales, Inc., as field sales engineers for the states of Ohio and Michigan.

New Capacity . . . WESTINGHOUSE ELECTRIC CORP. will operate its Sunnyvale, Calif., plant as a single unit under the managership of George F. Gayer. It will be known as the Pacific Coast Manufacturing plant.

Complete Steel Service* from One Source

This completely modern plant with latest type equipment for *rolling* strip and processing sheet and strip steel is your ideal source for:

- *Warehouse stocks in sheets, plates, coils, cut lengths . . . All tempers and finishes.
- *Steel strip in coils and cut lengths . . . restricted tolerances, all tempers and finishes.
- *Roller leveling, pickling, annealing, shearing, slitting and skin rolling.

PRODUCTION STEEL STRIP CORPORATION supplements our regular warehouse service with custom steel at mill prices. This new, 4-high, reversing type cold strip mill with its modern, electronically operated *fingertip* quality control affords unusual flexibility in supplying steel strip to your exact specifications. Thickness .025 to .125 in all tempers and either bright or satin finish, can be processed to your exact width in coil or cut lengths.

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2801 Roosevelt Rd., Broadview, Ill. (Chicago)
Phone: MAnsfield 6-4242

SENECA STEEL SERVICE, INC.
1050 Military Rd., Buffalo 17, N. Y
Phone: Riverside 7920

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Phone: Broadway 3468
E. W. Richardson, Sales Representative

PRODUCTION STEEL COMPANY
548 W. Mechanic Street, Jackson, Mich.
Phone: 2-9097
Glenn Christman, Sales Representative

PRODUCTION STEEL CO. OF ILLINOIS
7521 West Dixon St., Milwaukee, Wisc.
Phone: BLuemound 8-8323
Warren P. Bidwell, Sales Representative

SENECA STEEL SERVICE, INC.
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W. J. Knoll, Sales Representative

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Phone: Syracuse 2-5900
Donald M. McEwan, Sales Representative

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Phone: Howard 7407
Tony Canadeo, Sales Representative

Experimental Cars Prove Worth

No longer felt to be just publicity stunts . . . Test public opinion, new ideas . . . Influence '54 models . . . Hudson shows Italia . . . Airscoops cool brakes—*By R. D. Raddant.*

Value of futuristic experimental cars that have flooded the industry must be measured in terms of their contribution to advancement of the modern car.

They are no longer considered show pieces or eye catchers. Any doubt of their practical value will be easily dispelled with the introduction of 1954 models.

Serve Double Purpose . . . In General Motors alone, the influence of GM's five plastic dream cars that were introduced for show purposes last year will be easily apparent in 1954 lines. They served the double purpose of laboratories on wheels and testing grounds of public opinion.

Packard's Caribbean, Chevrolet's Corvette, Buick's Skylark and others are examples of experimental cars that actually went into production when public reaction to trial models was favorable enough to convince automakers they were worth a try on the market.

Hudson Shows Italia . . . Hudson's car of the future was unveiled this week, passing the test not only as a showpiece but as a valid experimental model with innovations that may be adopted in future years. It is known as the "Italia," a closed coupe with a low silhouette.

Its low design, nearly 10 in. lower than the standard Hudson, takes the famous stepdown design a step further with its floor recessed into the base frame.

Probably the most striking features externally are functional airscoops set in the front fenders to cool front brakes. Intakes are also provided for rear brakes. Since brake dissipation is a growing problem in modern cars, these could easily be incorporated into into future models.

Run Doors Into Roof . . . Another new feature makes it easy to step into the car without bumping or having to duck low in spite of the extremely low design. Doors are carried 14 in. into the roof so a passenger can get into his seat more in the manner of sitting down in a conventional chair.

If this survives the test of opening the door in rainy weather without flooding the interior, it also could have possibilities for the future.

The Italia is built on a conventional chassis and is powered by a conventional Jet engine. It was designed by Carrozzeria Touring in Milan, Italy, in collaboration with Hudson engineers and designers.

HUDSON'S STREAMLINED ITALIA is nearly 10 in. lower than the company's standard models.

Fire Problems . . . By the time the salvage job at GM's ill-fated Detroit transmission plant was well underway, problems resulting from the fire fell into three classifications.

First was the attempt to return to production of Hydramatic drive transmissions for the three GM users. Second was the problem of converting Cadillac and Oldsmobile to Dynaflow and Pontiac to Powerglide until Hydramatic production can be resumed. Third was the scrambling of non-GM Hydramatic users for alternate transmissions.

B-W Logical Source . . . Taking the third problem first, it appeared that Borg-Warner would be the major beneficiary. Already the automatic transmission maker for Ford, Mercury and Studebaker, B-W was the logical source.

Announcement was expected late last week of a new transmission for Lincoln. It was immediately but unofficially called the Lincomatic in view of the Fordomatic and Mercomatics used in other Ford products. It was under study and test and appeared to be just a few wrinkles away from adoption.

Help Out Lincoln . . . This could put Lincoln back into production in a hurry. Ford already makes about half its transmissions for Ford and Mercury and presumably the change to a Lincoln transmission would not be too great.

Also in a tough spot is Hudson, which has its new cars almost ready for introduction, probably late this month. While no decision was immediately announced, this independent was also a logical B-W candidate.

B-W, meanwhile, happily indicated it would be able to help out if needed. Two B-W plants are making transmissions: Detroit Gear for Studebaker and the Jaguar, and Warner Gear in Muncie, Ind. for

Ford and Mercury. Recently B W announced plans for a new 400,000-sq-ft expansion in Decatur, Ill.

Just when Hydramatic production will be resumed is still a doubtful date. Those who talked about miracles in terms of weeks were a little optimistic, but October should see a respectable production coming out of leased space at Willow Run.

Cadillac Back First

On the third front, Cadillac was due to start production Sept. 8 with Dynaflow transmission borrowed from Buick. Oldsmobile would soon follow suit. Probably emphasis will be to put Cadillac, with its comparatively small production, back on its feet first.

A lot of engineering work must be done on both, but test units were on the GM proving ground in a matter of days and both divisions appeared to be satisfied with results. Buick faced a major production problem of providing Dynaflow units. Before the fire it was already on a three-shift, five-day basis.

Another fire casualty appeared to be tooling plans for a new and improved Hydramatic transmission. Some tooling had already been let but with all emphasis now on the emergency, future plans will no doubt have to wait.

Auto Export Sales Dip in 1953

American automobiles seem to be losing some of their appeal abroad. Even with a much higher output this year, the number of U. S. cars going into the foreign market is still trailing behind the 1952 rate.

In the first 7 months of this year, 208,252 motor vehicles were shipped abroad. This amounts to 4.5 pct of total factory sales. Last year the same 7 months saw 213,922 units exported, a total of 7 pct.

According to statistics compiled by the Automobile Manufacturers Assn., sales of passenger cars in July were the highest since early 1951. July sales were 599,077 compared to 617,399 in March of that year.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Sept. 5, 1953..	114,497*	23,501*
Aug. 29, 1953..	127,411	25,455
Sept. 6, 1952..	90,885	20,210
Aug. 30, 1952..	100,092	22,567

*Estimated Source: *Ward's Reports*

Cleveland:

Ford plant gives major boost to automaking facilities.

Some jealous Detroiters are inclined to look askance at Cleveland. Building up by this neighboring city of auto manufacturing facilities is beginning to look like robbery to them.

What's worse is that the biggest offender, from this point of view, is Ford, once considered Detroit's permanent property.

Ford, which announced plans for a new engine plant in Cleveland last week, will have three plants and almost 3 million sq ft of manufacturing space in the Brookpark area near Cleveland. Most sources think it won't end there, predict that a body plant and possibly assembly will be added to make an integrated manufacturing plant.

Under Ford's announced plans to spread about $500 million more in expansion in the next few years, this is entirely possible.

The new engine plant will augment the highly publicized and highly automated Cleveland foundry and engine plants. The engine plant has been producing 6-cylinder engines and is being tooled to produce the new Mercury V-8. The new plant will make V-8's for cars and trucks.

Test Jet Engines at Thompson

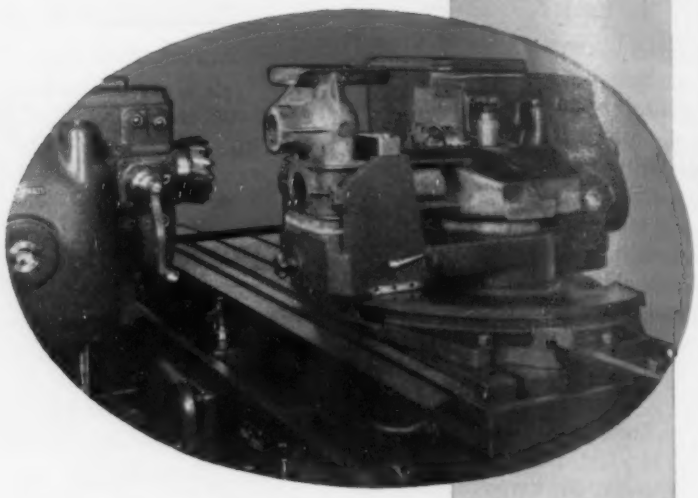
Any jet engine now in production or being developed can be handled at the $1.2 million engine components test facility which Thompson Products, Inc., Cleveland, will build and operate, the Navy says.

Thompson recently signed a contract with Bureau of Aeronautics to construct the plant in North Perry Township, Ohio, adjoining Lake Erie. Part of the cost is to buy land for a plant site.

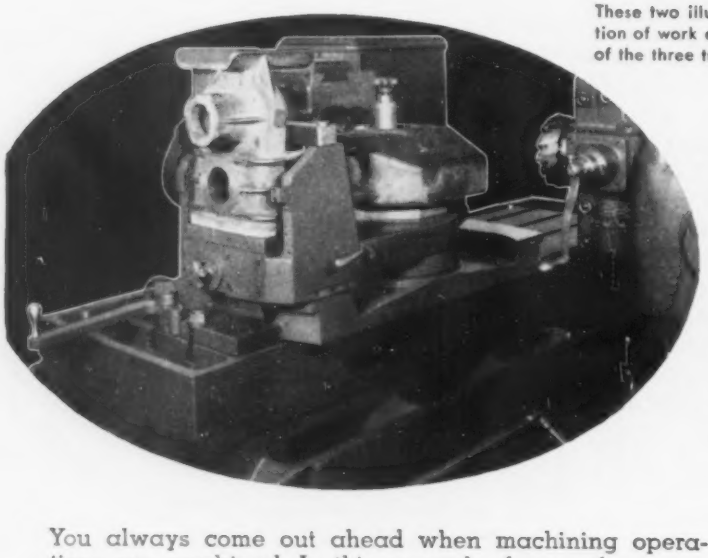
THE BULL OF THE WOODS — By J. R. Williams

NEVER MIND HOW MUCH I GOT IN TH' BANK! I'M EATIN'--BUT I GOT SENSE!
NO OFFENSE! YOU JUST LOOK LIKE YOU'RE SAVIN' MORE!
FOR TWENTY YEARS ONE'S BEEN EXPECTIN' THE OTHER TO DROP ANY MINUTE FOR OPPOSITE REASONS!
FAT SEZ SPOOK'S AFRAID TO LIVE CUZ HE'S AFRAID TO DIE--AND SPOOK SEZ FAT'S TH' REASON WHY THEY GAVE ELEPHANTS FOUR LEGS-- THEY CARRY ON LONGER!
SHOP VAUDEVILLE
9-11
J.R.WILLIAMS
Copr. 1953 by NEA Service, Inc. T. M. Reg. U. S. Pat. Off.

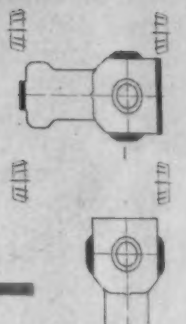
This Ingenious Hydromatic Setup Combines 2 operations in one

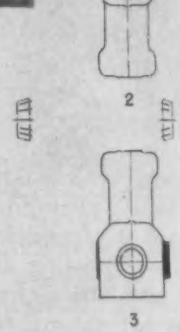


These two illustrations show the position of work and index fixture for two of the three trips past the cutters.



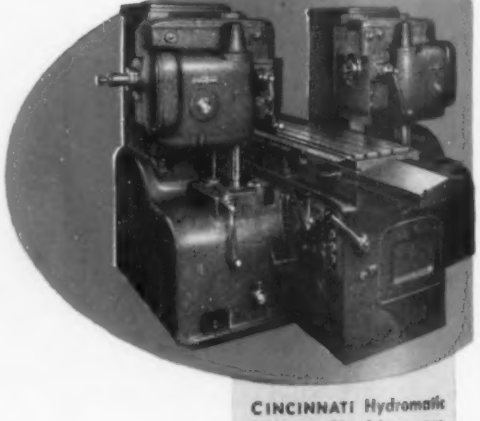
Drawing of part and sequence of feed cycles for milling four surfaces in one setting. Heavy lines indicate milled surfaces.





Part name	Gear housing
Material	Cast iron
Operation	Mill four surfaces
Depth of cut	3/16"
Feed	16" per minute
Cutting speed	223 feet per minute
Production	5 per hour

You always come out ahead when machining operations are combined. In this example, four surfaces are milled in one setting of the work, resulting in a 50% saving in setup time and handling time for a builder of agricultural machinery. ¶To gain the advantage of two cutter spindles working together, Cincinnati Application Engineers assigned the job to a duplex style CINCINNATI Hydromatic Milling Machine. One fixture and one handling of the work takes care of what ordinarily would be considered two operations. The fixture has three index positions. (See explanatory drawings.) With sintered carbide face mills and a feed cycle which cuts in both directions of table traverse, an excellent finish is produced at low cost. ¶CINCINNATI Hydromatics offer several advantages for work of this type: automatic table feed cycles, one-way or two-way feed; seven ranges of spindle speeds with plenty of power for high speed steel and sintered carbide cutters; standard and complementary units to provide special machine features at low cost. ¶For complete information write for catalog No. M-1670-1.



CINCINNATI Hydromatic Milling Machines are built in plain and duplex styles; 18 sizes of each. Complete data may be obtained by writing for catalog No. M-1670-1.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

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MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • FLAME HARDENING MACHINES
OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

Stress Mobility in Mobilization Plans

Pentagon must determine at what capacity pilot plants will operate . . . How to keep skilled labor force intact is one of the main problems . . . Must be solved—By G. H. Baker.

Now that nearly all Army-Navy-Air Force production goals are within sight, the Pentagon is faced with a basic and all-important industrial question: To what extent should the so-called "pilot lines" be kept in operation?

Answer is that nearly all of them are to be kept going. The problem is to determine at what capacity they will operate.

Secretary of Defense Charles Wilson and his staff understand clearly one basic point that often eluded the Truman mobilization planners: The mobilization base must be kept dynamic. Plan of the former administration was to set a fixed goal and drive for attainment—only to find that factors such as foreign aggression or domestic industrial shortages had upset the timetable.

Must Be Flexible . . . New concept, which is being impressed on all mobilization offices, is that a state of military preparedness can never remain static. Basic plans must be subject to changes, additions, revisions as international and domestic conditions change.

One of the most important factors in carrying out this concept is manpower. Mr. Wilson wants at all costs to keep a strong nucleus of industrial skills and talents. He knows it is not enough to have only the tools and the equipment needed for military preparedness. People are even more important.

Ready to Shift . . . One way to hold skilled labor is to switch personnel to civilian production when military orders show the first signs of tapering off. The nation can't afford to allow erosion of its skilled manpower by permitting its topnotch technicians such as diemakers to drift away into jobs offering good pay but not requiring skilled work.

A concerted effort is to be made in the months ahead to keep skilled workers in skilled civilian trades. How far the Pentagon can go in enforcing such a course is a wide-open question, but Mr. Wilson and his aides believe the way will be found.

Close Some Plants . . . As far as cutbacks of defense contracts are concerned, the present Defense Dept. plan contemplates the possibility of closing some plants.

For example: Five plants are operating 8 hours a day making carburetors for the military. If requirements for carburetors are cut 20 pct, it would not be economic to keep all five plants operating at a greatly-reduced level of operation.

Have Nickel Headache . . . Office of Defense Mobilization continues to ponder industry's bid for decontrol of nickel.

Arthur S. Flemming, ODM director, is studying recommendations for decontrol on Oct. 1. The recommendations were prepared by National Production Authority's nickel advisory group.

Some officials suggest that ODM will wait until the last week of September to announce its decision. And there is further speculation that the effective date of decontrol may be Jan 1, 1954, rather than Oct 1, 1953.

Mr. Flemming points out that military demand for nickel is expected to remain high.

"Bear with me if I'm grumpy today. My boy took his college aptitude test and it seems his strongest leaning is toward living like a millionaire."

Study Antitrust Laws . . . Two goals lie ahead of Attorney General Brownell's new committee to examine the nations' antitrust laws: (1) To determine how existing laws may be simplified and made more workable; (2) Find out how the government can create stronger public support for their enforcement.

The new committee, which is headed by Stanley N. Barnes, head of the Justice Department's Antitrust Division, and S. Chesterfield Oppenheim, University of Michigan law professor, is now embarked on what Mr. Brownell calls "an impartial and nonpolitical study" of federal antitrust laws.

What It Will Do . . . A complete investigation of all federal antitrust authority, together with suggestions and recommendations for improving the structure of antitrust and antimonopoly law enforcement, is the committee's basic assignment.

The committee is composed of members holding widely varied viewpoints on the controversial aspects of antitrust policy, Mr. Brownell states.

Need an Idea? . . . Inventions owned or licensed by the government may be of considerable value to the businessman who knows

The element of

PRIDE IN CRAFTSMANSHIP

Pride plays a big part in how well a man does his job. At American Welding, AWQ symbolizes American Welding Quality. To 800 craftsmen skilled in the art of forming, welding and machining of rings, bands and assembled components it is a constant reminder that know-how and good equipment are not enough. Every man must constantly strive to do his best.

It is this pride in one's job that enables American Welding to produce welded components with the same care that you would use in your own plant. So, if your problem can be solved by welding — either fusion or resistance — of any type of material — or a component or part that can be joined by welding — call your local Amweld representative or write us. We will be happy to put plant facilities, 35 years of experience, and most important, men with pride in AWQ, to work for you.

A company you'll like to deal with

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now to make use of them, a new Small Business Administration leaflet points out.

Entitled, *Inventions: Government-Owned; Government-Licensed; and Registered for License or Sale*, the leaflet is part of what SBA calls a "new service" to small manufacturers. It tells where to find summaries and analyses of more than 19,000 inventions in which there is a federal interest.

Inventions owned outright by the government, it explains, are available under "nonexclusive, revokable, royalty-free license."

Copies of the leaflet are available free at SBA field offices.

Cutbacks:

Won't affect air strength . . . Plan switch in plane types.

Present combat plane production rates and the speed at which aerial strength is developing will not be affected by a $750 million reduction in Air Force procurement plans, claims Defense Dept.

Of the 965 aircraft which have been dropped from the Air Force buying program, 151 are B-47 jet bombers which were already on order. The others, including 18 other B-47s, 579 jet fighters, 207 trainers, and 10 helicopters, had been planned, but not ordered.

Defense Secretary Wilson says the move is not a cutback and not a portion of a Defense Dept. economy move. He calls it the result of an overall Air Force survey of current production and future requirements.

Money thus saved belongs to the Air Force, which will order more modern planes. Some of these will be an additional number of F-100 fighters. These are known to have attained supersonic speed.

Under Secretary of the Air Force James H. Douglas says he is considering opening a second plant for production of 8-engine B-52 bombers. Boeing has these in early production stages at its Seattle plant.

The change in B-47 orders will mean a long stretchout in production at the Boeing plant in Wichita, Kan.; the Lockheed plant in Marietta, Ga.; and the Douglas plant at Tulsa, Okla.

Most of the B-47s were to have been used by Air Training Command to teach crews for Strategic Air Command, but the latter will now handle its own final crew training.

Mr. Douglas insisted that planes involved in the reduction would not be required even if the former Air Force goal of 143 wings were reinstated by the Joint Chiefs of Staff. Present Administration goal is 120 wings.

Personal Income at Record Rate

Paychecks and other personal payments across the country were being passed out at the record-breaking annual rate of $284 billion in the first 7 months of this year.

This figure tops by 7 pct the previous high for personal earnings—$269.7 billion in 1952.

Reflected as "personal income" in this new government estimate are wages, salaries, dividends, interest, income of partnerships and proprietorships, rent, and other types of individual income.

In July, personal income set a 30-day record to boost the annual income rate to $288.1 billion.

Drop Metals Exports Time Limit

Magnesium metal and five carbon steel items have been removed from timetable licensing by U. S. Office of International Trade. Export license applications for magnesium may now be filed for shipment at any time. Those for carbon steel also may be filed now for fourth quarter shipment after Oct. 1.

"They put real stuff into autos in those days."

The carbon steel items, previously open-ended for the fourth quarter, are: Standard rail (Schedule B No. 605110); plate (603125, 618963 and 618965); structurals (604510, 605000 and 618961); Oil country tubulars (606210 through 606260); and line pipe 16 in. in diameter and over (606270 and 606280).

Unemployment Dives to New Low

Nation-wide employment continues to hold at peak levels. In August, 63,408,000 workers were on payrolls—over 1 million more than in August, 1952.

Unemployment is running less than 2 pct of the total work force —a record low. Only 1.9 pct of all civilian workers were out of jobs in August, as compared with 2.5 pct a year ago, the Census Bureau reports.

Stretch Out U. S. Stockpiling

Government procurement of strategic materials is to be slowed down and spread out over a longer period of time. Reason: Office of Defense Mobilization is trimming its buying programs to fit its new and smaller pocketbook.

Barring a new world crisis, buying of scarce materials for the nation's stockpile is to be limited this year to items considered most vital to defense. While ODM declines to name the high-priority items it will continue to buy, it is believed that nickel, cobalt, columbite, and aluminum rank near the top of the list.

Contracts now in effect will not be disturbed. But all new contracts, with a few exceptions, are to be confined to 1-year periods. Overall effect of the cut-back is to cancel and postpone indefinitely the June, 1954, target date set for completion of many stockpiling programs.

For rugged conditioning jobs you can't beat...

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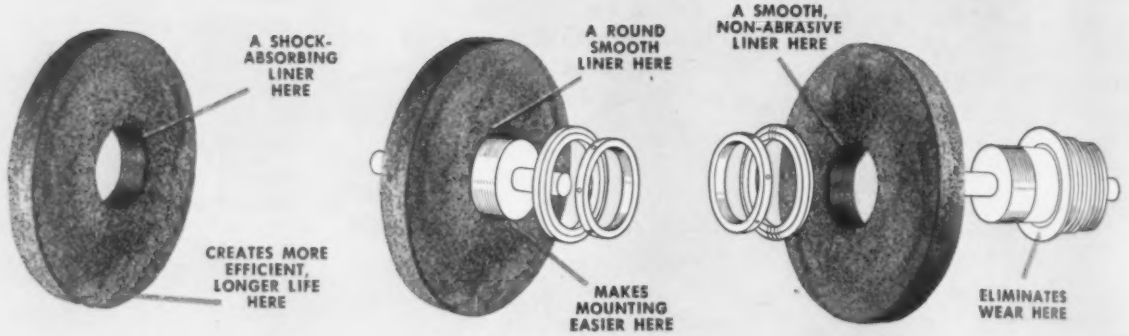
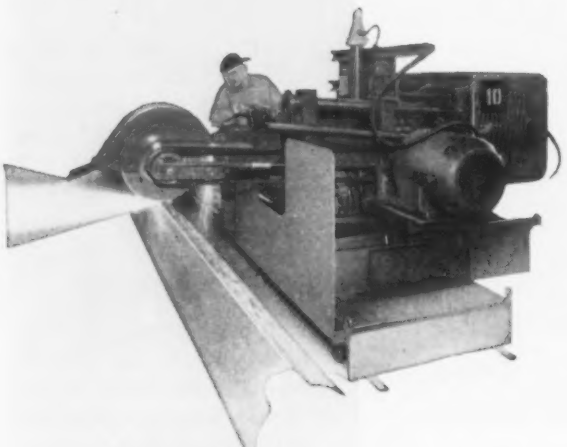

A SHOCK-ABSORBING LINER HERE
CREATES MORE EFFICIENT, LONGER LIFE HERE
A ROUND SMOOTH LINER HERE
MAKES MOUNTING EASIER HERE
A SMOOTH, NON-ABRASIVE LINER HERE
ELIMINATES WEAR HERE



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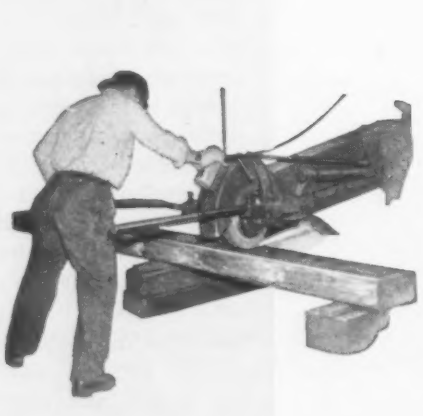
Mid-West designed fiber-cushioned centers, plus Mid-West's special resinoid bond—an extremely tough, tenacious bond—assure increased production and lower grinding costs per ton! For complete information regarding fiber-cushioned snagging wheels—write, wire or phone today.



MID-WEST ABRASIVES

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Rains Keep Coast Potlines Warm

Western aluminum output has good year thanks to above-normal rainfall . . . See no firm power cuts this fall . . . May avoid steam generation if rains keep up—By *T. M. Rohan.*

Pacific Northwest aluminum production last week appeared headed for one of its better years, thanks to heavy rainfall. But the curtain was coming down for the time being at least on expansion of basic production capacity.

Bonneville officials in Portland said there appears no likelihood of a cut in firm power this year and only a partial cut in interruptible, even if rainfall is below normal from now on.

The Pacific Northwest last season hit an alltime low on water flow with all interruptible power curtailed as well as 110,000 kw of firm power. A sudden thaw saved a third cut of 30 pct.

Had Heavy Rainfaill . . . With normal rainfall this year all interruptible power can be delivered, backed by steam generation. With above normal rainfall, no higher-cost steam generation will be needed. Heavy summer rains (2.5 in. in Portland for August compared to normal 0.5 in.) was a contributing factor.

BPA tried again last week to keep industries and private utilities happy on a long term basis. A proposed new 20-year power contract supplanting the June proposal vigorously rejected by local industries (THE IRON AGE, June 18, 1953, p. 117) placed a 10,000-kw ceiling on new industries for both BPA and public utilities customers.

Haven't Answered . . . Private utilities reportedly have approved, but private industries have not replied. Expansion of fabrication facilities with resulting higher employment would be encouraged under the load limit.

Prospective new customers and expansions over 10,000 kw would go on an interruptible basis only, but after 5 years would become eligible for firm power.

Most aluminum plants already have high percentage of interruptible power, about 25 pct of total Pacific Northwest aluminum production capacity.

Kaiser's Mead, Wash., plant has 50 pct interruptible, while the proposed Harvey plant at The Dalles, Ore., will have 65 pct, or 40,000 kw firm and 80,000 kw interruptible, signed for in January. Reynolds at Longview, Wash., is on 40 pct interruptible and the Alcoa Vancouver, Wash., plant is on 30 pct.

The 10,000-kw limit could also clamp the lid on recurring plans for iron ore smelters in the Pacific Northwest. Sufficient power has already been contracted for the $4.3 million Riddle Nickel smelter in Oregon for M. A. Hanna Co.

Tube Mill Starts . . . The West's first and only tube mill, a 175,000 annual ton unit in one of the richest oil producing areas, started trial runs last week. First output of 5-in. tubing of the Colorado Fuel and Iron Corp.'s $27.7 million unit at Pueblo, Colo., was termed "excellent."

Preliminary production runs are expected to start this week and a festival celebrating the opening is scheduled for October 4-7. Major equipment in the 10-acre mill includes a 275-ton rolling mill.

The revamped 25-in. mill (THE IRON AGE, July 30, 1953, p. 59) changed from ac to dc reversing drive with output doubled has met all expectations.

Sales Up, Profit Down . . . Like most steel company annual reports, Kaiser last week showed record sales. Sales in the fiscal year ended in June were $134 million or 14 pct over the 1951-52 figure of $117 million. A substantial portion was due to production from the new tinplate mill started in July, 1952.

Net income was $9.1 million or $2.12 per common share compared to $10.3 million or $2.52 for the preceding year.

"I'm Bleeding" . . . Competition among eastern alloy tubing producers for western markets is growing increasingly severe due to inventory cutbacks. One sales representative last week confided "sales are so slow I'm bleeding."

There was also an unsubstantiated report of freight absorption by western warehouses contrary to industry policy. Western warehouses handling the most common grade Type 304, for instance, have about a 70 pct markup if bought from mills in 5000 ft lots and sold in 149 ft lots. On Type 304 this works out to a buying price of 95 cents per ft and $1.38 per ft selling price.

Actually, sales, warehousing, handling and distributing costs shave this considerably. But in hundredweight quantities freight absorption would permit western warehouses to deliver at $138.72 per hundredweight in San Francisco, compared to a delivered eastern price of $141.59.

Users report excellent results with New Sunicut S Oils

In just six months, these unique new straight cutting oils have "Job Proved" themselves as top performers in many metalworking shops all through the industry.

Reports like these keep coming in:

AN AUTO PARTS MANUFACTURER INFORMS US, "Threaded parts are as much as 50° cooler when they come off the machines. And our operators like the clear, clean, odorless qualities of Sunicut 102-S."

SCREW MACHINE SHOPS REPORT, "The versatility of Sunicut 209-S permits us to reduce the number of oils we must stock."

BROWN & SHARPE SCREW MACHINE OPERATORS SAY, "Sunicut 11-S increases tool life, gives finer finishes, eliminates staining problem."

LARGE IMPLEMENT MANUFACTURER TELLS US, "We get better finishes in our broaching operations with Sunicut 110-S, and our operators favor its light color."

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Gear Makers Confident About Second Half

Though new order rate is falling, gear manufacturers expect '53 to be about as good as last year . . . Defense slowdown hasn't hurt too much . . . GM rebuilds—*By E. C. Beaudet.*

Despite some falling off of orders, the outlook for gear manufacturers for the second half of the year continues bright. Present indications are that business during 1953 will stay at about the same high level of last year.

New orders during the summer months have fallen slightly. However, the June-July-August period is normally a slow one due to vacation shutdowns throughout industry.

Somewhat offsetting the summer slump in new orders was the fact that backlogs were held at a higher level than expected because of serious strikes in some gear manufacturers' plants earlier in the year. At present the industry has a six to seven month backlog which assures high production for the rest of 1953.

Cutbacks Not Critical . . . Slowdown of defense business has not hit the gear manufacturers as hard as it has other industries.

The American Gear Manufacturers' Association index, which shows the volume of new orders, averaged 145.6 for all of 1952. This figure, when compared with the monthly averages so far this year, makes 1953 look like a good year. Breakdown for the first seven months of 1953 is:

January	161.4
February	188.1
March	158.9
April	217.1
May	189.8
June	146.5
July	120.7

Shipments Top Orders . . . Shipments are currently exceeding new order bookings. In terms of dollars, backlog for AGMA members is around $90 million. This compares with $100 million at the beginning of the year when backlogs were estimated at nine to ten months. Prospects are that index figures will tend to level off as the year ends rather than suffer a sharp drop.

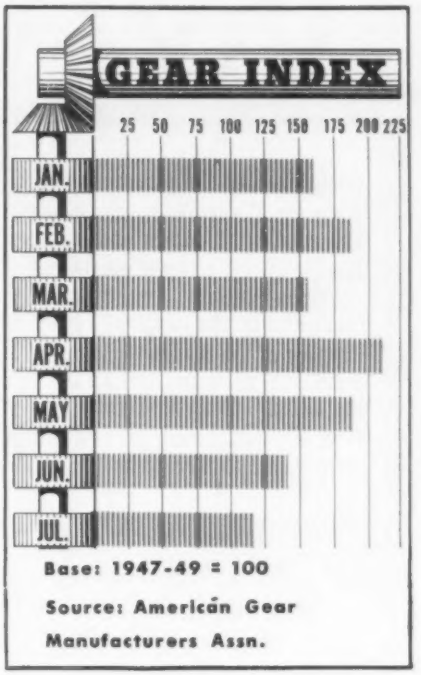
A comparison of recent years in terms of 1935-1939 index of 100 shows the growth of the industry:

1952-495.2	1950-457.2
1951-695-7	1949-259.0

According to the index figures, 1952 was one of the best years in the history of the industry. If 1953 turns out as well, as it appears in will, gear manufacturers will be well satisfied.

Rebuild GM Tools . . . Chevrolet, like other General Motors divisions, it going all out in the restoration of machine tools damaged by the fire at the Detroit Transmission plant.

RESTORING damaged machine tools at Chevrolet's Tonawanda plant. Like others the plant is repairing round-the-clock.



At the Chevrolet-Tonawanda Div. repairmen are currently working on the first of 52 machines scheduled into the plant. Rebuilding this equipment is being done on a 24-hour basis.

Two other plants, at Detroit and Flint, have joined in the restoration work on scores of machines and three others at Bay City, Saginaw and Toledo have begun manufacturing dozens of transmission parts.

Work Overtime . . . Augmenting efforts of the GM divisions, are the plants of many machine tool builders throughout all sections of the country. Overtime is the rule as builders press to meet GM completion schedules.

One minor benefit of the great rebuilding effort will be the experience gained by firms in restoring damaged equipment. One of the greatest tasks along this line is overcoming the effect of the fires terrific heat which caused the metal to expand and threw off critical dimensions of the machine tools.

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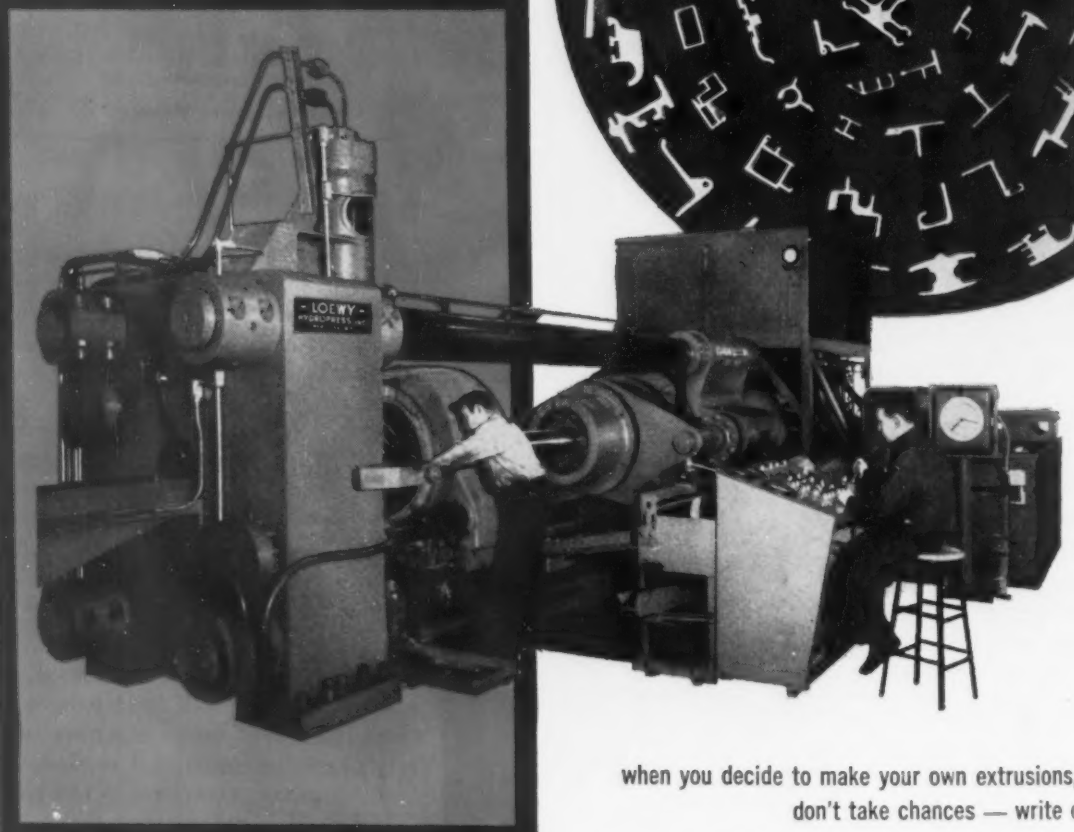

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REPORT TO MANAGEMENT...

Profit shirt shrinks

Like a dollar shirt your profits per dollar of sales have shrunk remarkably over the years. Yet, paradoxically industry has posted peak profits despite adversities of higher taxes, spiralling labor and materials costs. To the casual observer the shirt may not seem ill-fitting--but you know it's chafing under the armpits and the collar's too tight.

You can't relax

What has fended off inroads of shriveling profit margins has been vastly expanded production. It follows that you cannot relax top volume selling for fear high operating costs, many of which won't budge appreciably down, will ink your financial report in red.

Profits on roller coaster

Producing in 1926 a fraction of what you are today, you nevertheless had a comfortable profit margin. On the basis that 1947 equals 100, index of profits per dollar of sales (after taxes) of manufacturing corporations in 1926 was 225. Today there is a higher premium for business acumen--for in 1952 the index stood at 112. Still respectable in 1940, the index was 180 but from then on it swooped to 75 in war-year 1945, rose up to 154 in 1949. From then on, inflation took murderous cuts at it. Meanwhile, purchasing power of industry, based on constant dollars, has registered only a fractional increase in relation to multiplied production.

Where all your money goes

Significantly, profits per dollar before taxes were about 118 in 1926 and 142 in 1952. You can see where a lot of your money goes. It will pay you to champion sensible tax cuts based on government economies. This will be no panacea for profits for we are in a big world, we have big commitments, and we need a big government--but not monstrously big.

Keep high costs manageable

While you support tax pruning, you have more active obligations to your company, your economy. One of these is to keep output at full throttle, navigate cleverly through a more competitive market with shrewder selling, new products. See that your production chart doesn't downtrend to let fixed high costs swarm all over you.

Worker's lot a happy one

Union initiative, spurts of prosperity during which you could not suffer a strike, and sometimes downright competition for labor has stuffed your workers' pay envelopes with more and more money. Labor has become one of the irreducible high fixed costs, made more burdensome by long-term fringe benefits. Gross average hourly earnings of manufacturing workers in 1939 were about 63¢ an hour--and the dollar was worth 100¢. Last July these same workers were getting $1.77 per hour--while the dollar was worth 55.2¢. Inflation notwithstanding, the worker's lot has not been an unhappy one. Yours has not been so fortunate.

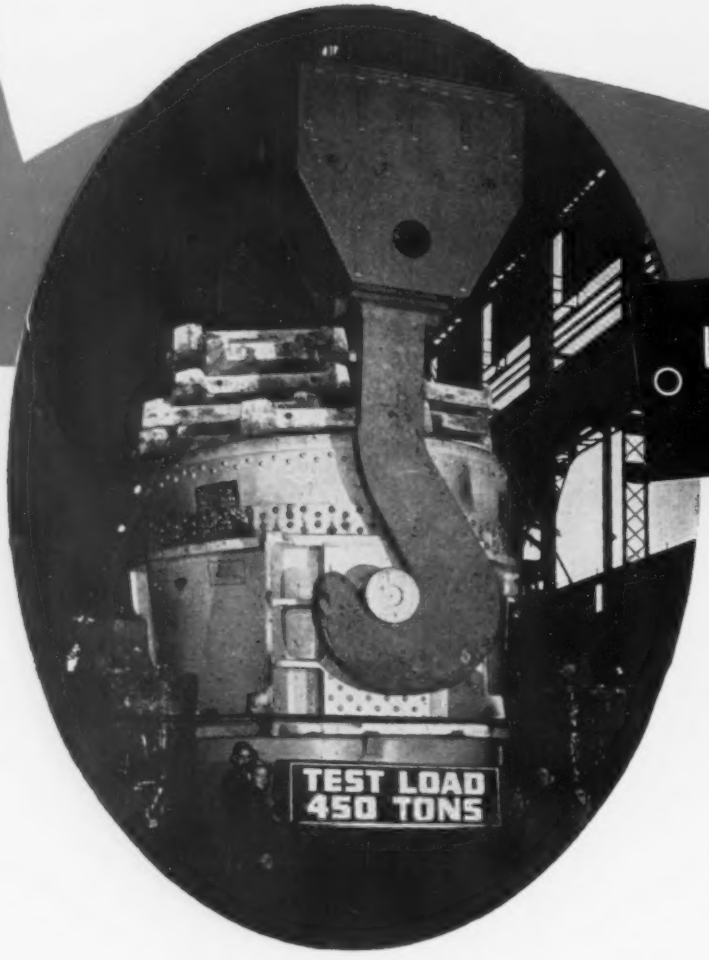
Draw reasonable wage line

You have been under severe compulsion to grant periodic wage increases. Now a spirit of resistance is shaping in industry to modify open-handed concepts of dealing with labor. This is clearly and definitely not an anti-labor campaign. Labor's too vital as a worker-consumer. But industrialists are realizing the line must be drawn beyond which wage demands without economic justification should not pass.

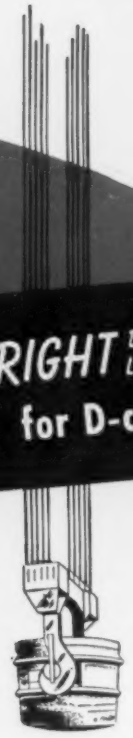
Give union economic facts

You will gain nothing by mere stubborn refusal to negotiate "outrageous" union demands. Instead, give the union the economic facts on why you can't pay the outrageous. Don't hire a battery of economists to work out a favorable case for you. The unions are rich enough to hire their own economists who can use identical statistics and convert them into an opposing interpretation. Don't bother kidding each other.

SAFE CRANE CONTROL



WRIGHT DYNAMIC LOWERING CIRCUIT for D-c Crane-Hoists



New dynamic lowering circuits for D-c crane-hoists come and go—are superseded by other new circuits, but the well-known EC&M Wright Dynamic Lowering Circuit Hoist Controller continues to be first choice for industrial cranes.

Quick brake-release and fast-operating LINE-ARC Contactors permit accurate spotting of heavy loads—resulting in fewer inching movements, which maintenance men recognize as a contributing factor to reduced upkeep.

Also important is that the operator has direct control (from the Master Switch) of all loads in the lowering direction. The EC&M Wright Circuit is SAFE.

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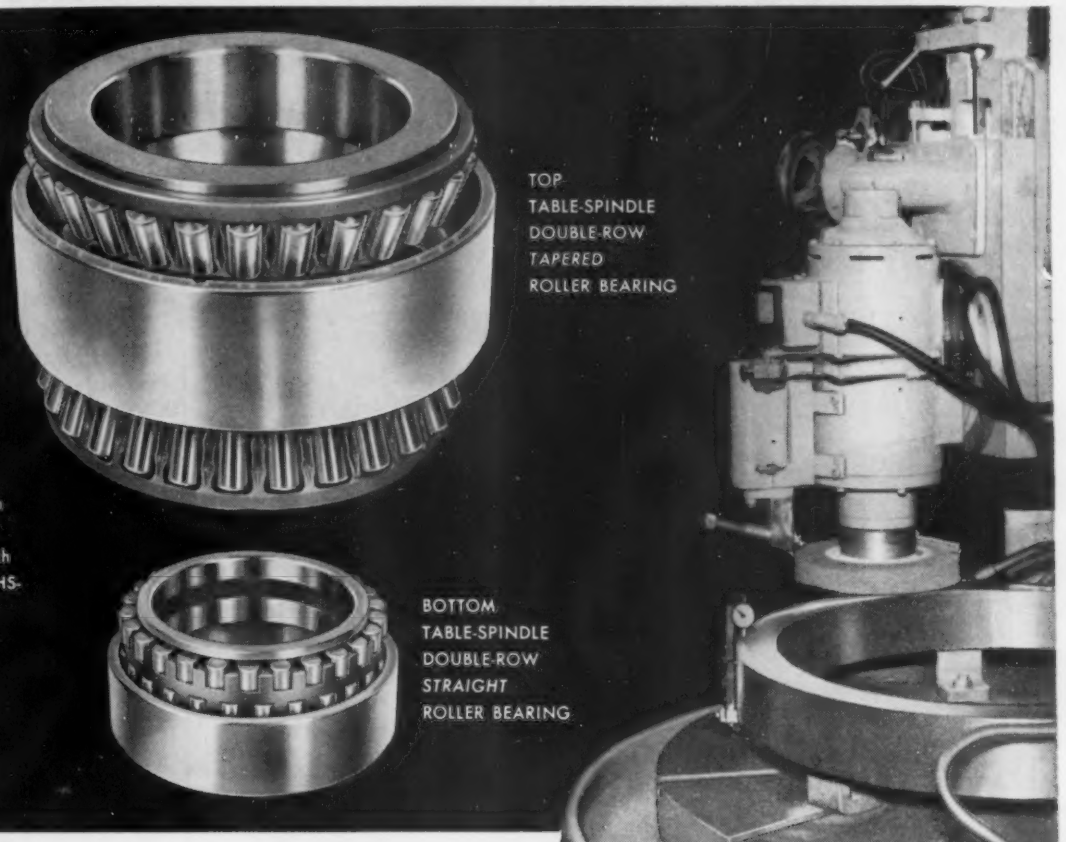
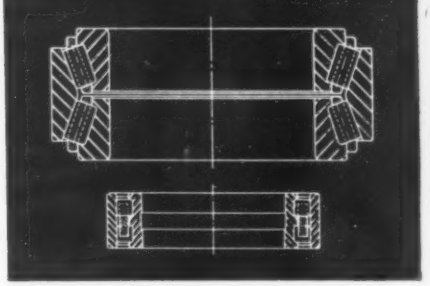


WHY KAYDON Bearings assure millionths-of-an-inch precision with Frauenthal Grinders

WHAT gives Frauenthal Grinders such dependable super-precision performance? Answer: TWO double-row preloaded KAYDON super-precision bearings! *WHERE?* In the table-spindles of these modern "Millionths-of-an-inch" grinders, one KAYDON double-row *tapered* roller bearing at top of spindle, and one KAYDON double-row *straight* roller bearing at bottom (designed to allow for thermal changes without affecting the upper bearing). Both are preloaded oversize bearings. RESULTS: Super-precision grinders vital to production of much of the modern military and industrial equipment responsible for America's leadership.

For machines you *make* to *sell*, or *buy* to *use*, specify KAYDON Bearings. Contact KAYDON at Muskegon.



Cross-section showing top double-row *tapered*, and bottom double-row *straight* roller bearings, engineered and produced by KAYDON for Frauenthal Grinders.

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Welder's glasses

Improved vision for welders who wear bifocal glasses is said to be made possible by Ortho-Weld magnifying lenses. The lenses, precision-molded of lucite, are made to fit all standard welding helmets. Inserted between the regular helmet filter lens and the rear cover plate of the lens holder, these lenses give bifocal-wearing welders comfortable close-up vision at any angle. *Bausch & Lomb Optical Co.*

For free copy circle No. 12 on postcard, p. 133.

Pumps

Problems of pump installation are discussed in a new technical circular available from Viking Pump Co. Written by the company's chief field engineer, the publication discusses pump installation in detail and contains several explanatory illustrations. *Viking Pump Co.*

For free copy circle No. 13 on postcard, p. 133.

Motors, generators

General Dynamics Corp. has published a new catalog covering its line of motors and generators. Detailed information on performance, dimensional data, construction advantages, installation photographs and company history have been summarized in 12 pages. Product information has been simplified into easy-to-read charts to aid users in the selection of motors for ordinary applications of polyphase squirrel-cage induction motors. *General Dynamics Corp.*

For free copy circle No. 14 on postcard, p. 133.

Welding equipment

Welding equipment designed for high production is discussed in a new catalog available from Multi-Hydromatic Welding & Mfg. Co. Described are units such as portable welding equipment, automatic multiple spot welding equipment, specially designed fixtures, welding presses, resistance welding transformers and accessories. *Multi-Hydromatic Welding & Mfg. Co.*

For free copy circle No. 15 on postcard, p. 133.

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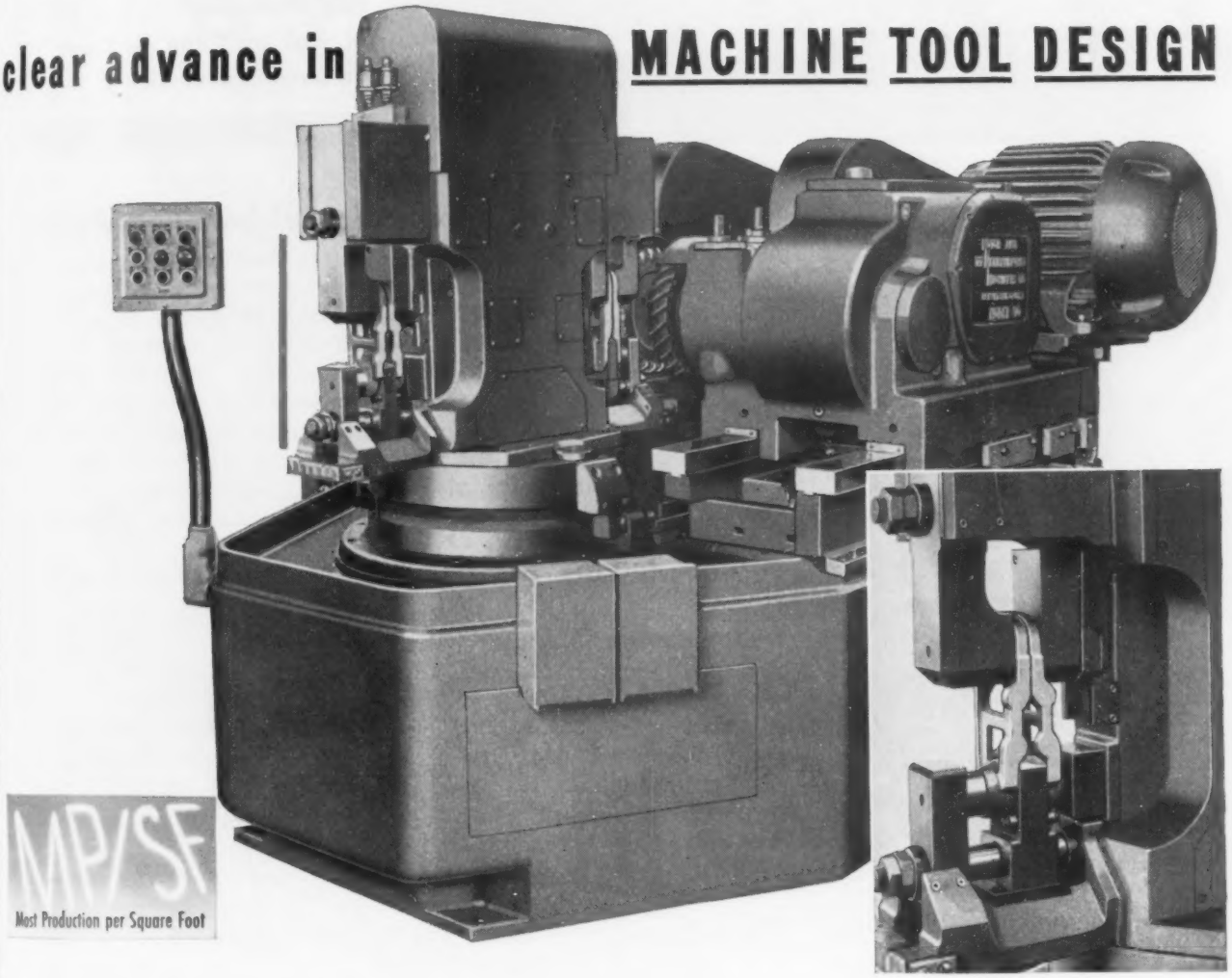

Each machine tool built by us is charged with doing a specific job better than before and for less. To us that is a privilege—a challenge—an obligation. Every machine developed by the Motch & Merryweather engineering staff must earn a permanent place for itself in Industry—must contribute permanently to a nation's advance in point of efficiency and economy—must mark a visible step forward in machine tool design and construction . . . An example is outlined on this page.

This M & M duplex production single-purpose milling machine mills two tractor side bars while two others are being loaded (removing at same station). Actually mills 70% of the time; up to 268 side bars per hour @ 100%. Two heads move, not the operator. Rigidity and power (30 h.p.) hike output. Fixtures to suit.

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Builders of Circular Sawing Equipment, Production Milling, Turning and Special Machines

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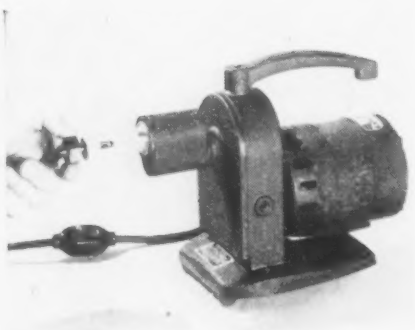
New and improved production ideas, equipment services and methods described here offer production economies . . . just fill in and mail the postcard on page 133 or 134.

Side-loading truck speeds steel handling work

A 30,000-lb capacity Traveloader —a combination side-loading fork truck and load carrier—speeds the handling of flat or coiled steel stock in steel mills and warehouses. This self-loading unit picks up loads from the side, hauls them lengthwise within the width of the unit and stacks them parallel to aisles. Because loads are carried inboard, on the load deck, the truck provides high stability which allows safe operation at speeds up to 30 mph. Hydraulically-operated stabilizing jacks are controlled from the driver's seat. One man controls the entire operation from his driving position with unobstructed visibility. *Baker-Raulang Co.*

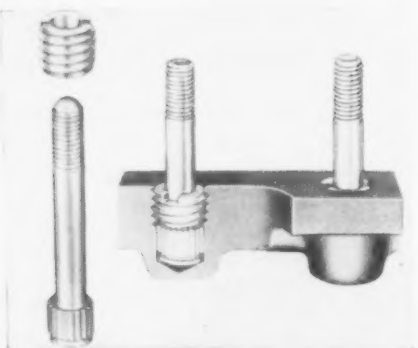
For more data circle No. 16 on postcard, p. 133.



Power thread gaging reduces inspection time

Like the flexible shaft model, the new bench model Rotochek is an electrically - operated gage for checking internal threads by power instead of by manual rotation. The gaging assembly is mounted directly on the motor unit, and is especially designed for bench inspection of threaded products. Its lightweight construction and a convenient handle above the motor facilitate its being transferred from one location to another. Workpiece is brought to the unit where a slight forward pressure causes the gaging member to screw into the part automatically. Reversal of pressure causes disengagement. *Taft-Peirce Mfg. Co.*

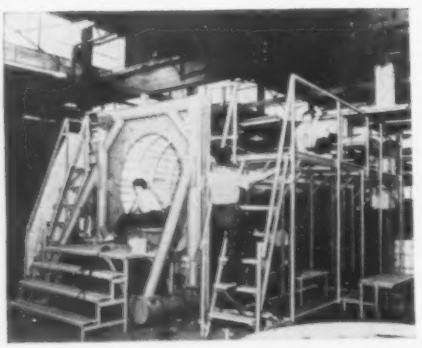
For more data circle No. 17 on postcard, p. 133.



Threaded studs offer many advantages

New threaded stud that may be installed in metal or plastics is made in two parts: a threaded stud with a knurled head and a separate pressure ring. The knurled head broaches its way into the base material and securely holds the stud against rotation. The pressure ring, screwed in place positively locks the stud against being pulled out. Combination of these two provides the three plane stability desirable in a stud. Installation or removal is extremely simple. The studs are available in cadmium plated alloy steels with ultimate tensile strengths to 165,000 psi, stainless steel or special alloys. *Newton Insert Co.*

For more data circle No. 18 on postcard, p. 133.



Frame of steel speeds assembly operations

One of 12 rolling scaffolds, tailor made to the job from Mult-A-Frame, a new framing material, helps speed assembly of aircraft fuselages at a large Detroit plant. Side sections on casters roll away when work is completed, making it easy for entire sub-assembly to be lifted out of the fixture by overhead crane. Stairs and tread supports also are made of Mult-A-Frame. Locking fittings permit scaffolds, racks, and frames to be erected quickly with only a saw and a wrench. Materials are completely reusable, can be adapted to new needs as the occasion arises. *Ainsworth Mfg. Corp.*

For more data circle No. 19 on postcard, p. 133.

Turn Page

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is our role!

On the seas, in a foundry or a steel plant . . . *control* is essential. It's the chief role of Keokuk Electro-Silvery Pig Iron in charging the cupola or blocking the open hearth. For with Keokuk, you are *assured* of *accurate* percentages of silicon . . . and, as suits your melt, alloys of manganese, chrome or nickel in various combinations. So, control both quality and costs with Keokuk. Write today for complete information!

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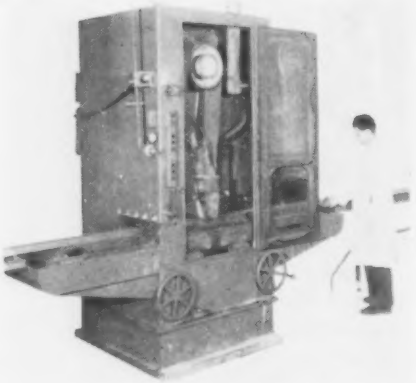
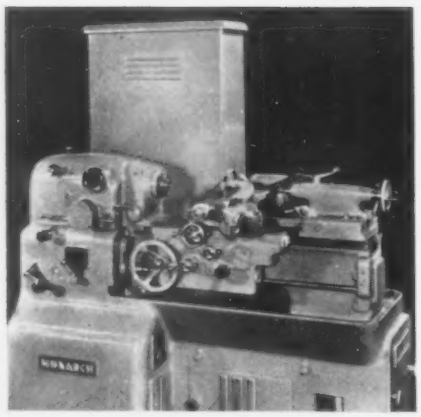


Production costs cut by using coated abrasives

Grinding aluminum extrusions with coated abrasives in preparation for final finishing can be performed at substantial saving with the Curtis Straight-O-Matic machine in conjunction with Carborundum's abrasive cloth belts. The setup shown accomplishes the polishing of extruded aluminum so rapidly that it is said five to six backstand operations formerly needed have been eliminated. The aluminum extrusions being polished are those used in manufacture of metal doors, window frames and ornamental trim which usually come in 21-ft lengths creating a handling problem for any form of grinding. One pass with a 120-grit belt, at a feed of 10 to 15 fpm has been found sufficient to remove surface imperfections or scratches from the extrusions. *Carborundum Co.*

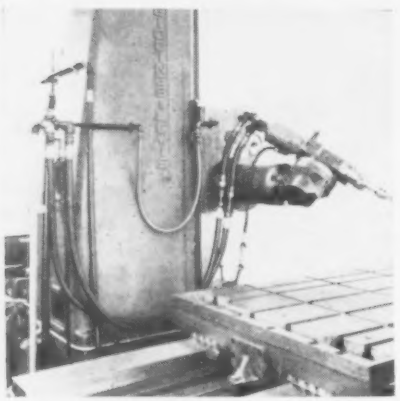
For more data circle No. 20 on postcard, p. 133.



Air-gage tracer developed for Monarch EE lathes

New Type C rigid air-gage tracer designed for Model EE toolmaker's and manufacturing lathes provides greater sensitivity and operating convenience than previously obtainable, and makes possible higher precision standards in turning of small parts. All Model EE machines equipped with the tracer are powered by an electronic drive, resulting in minimum vibration at all speeds. Conversion of the machine to manual operation can be accomplished easily and quickly in a few seconds. Feed range of the hydraulic slide, set at 45°, permits the turning of perfectly square shoulders. The tool is mounted on its own slide and can be adjusted for diameter changes without altering the template or tracer setup. Flat or round templates may be used. *Monarch Machine Tool Co.*

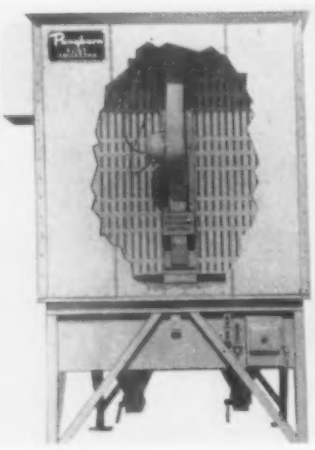
For more data circle No. 21 on postcard, p. 133.



Milling attachment speeds, simplifies operations

New type high speed milling attachment was designed to machine aluminum alloy forgings for airplane wing hinge sections. Used on a G&L table type horizontal boring, drilling and milling machine, it is said to be exceptionally well adapted for machining the many varying angles necessary on wing hinges. The attachment is independently driven; has no connection with the machine spindle and therefore does not depend upon high inertia driving elements in the headstock machine. Headstock acts only as carrier for moving the attachment up and down. The full swivel milling attachment can be quickly and easily mounted or removed by a special lifting means and quick-disconnecting fittings on the oil-pressure hoses. *Giddings & Lewis Machine Tool Co.*

For more data circle No. 22 on postcard, p. 133.



Dust collector cuts operating, maintenance costs

Self-cleaning cloth screen dust collector lowers costs by permitting continuous automatic dust collection, constant air volume and suction, and positive reverse flow filter cleaning. The unit uses the principle of reverse air flow for continuous cleaning of its cloth filters. This is accomplished by action of a traveling manifold with integral reverse air blower that takes its air directly from the clean air side of the collector. Mechanical arrangement causes the dust to be blown from all external surfaces of the filter elements and allows it to drop into a hopper instead of being re-entrained. Blower motor in the traveling manifold is interlocked with the main exhauster motor to insure simultaneous operation. Standard sizes are furnished with six-screen-high construction. *Pangborn Corp.*

For more data circle No. 23 on postcard, p. 133.

Turn Page

DIVERSITY OF EQUIPMENT for METAL WORKING

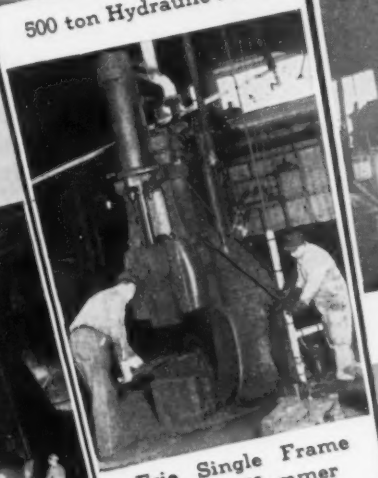
500 ton Hydraulic Press

Erie 4 roll Board Drop Hammer

Erie 25,000 lb. Steam Hammer

Erie Trimming Press

2 roll Board Drop Hammer



Erie Single Frame Forging Hammer

Erie Double Frame Forging Hammer

Erie 335 ton Hydraulic Press

FOR more than half a century Erie Foundry Company has served the metal-working industry with top performance steam and air operated hammers, board drop hammers, double and single frame forging hammers, trimming presses and hydraulic presses. Before making your selection consult with our engineers.

Bulletins on all of these products are yours on request.

ERIE FOUNDRY COMPANY ERIE, PENNSYLVANIA

ERIE

Dependable **FORGING HAMMERS • HYDRAULIC PRESSES**

here's large size in socket screws

(larger than usually listed)

Diameters up to 1 1/2"—and larger in full range of lengths

they're part of the

CLEVELAND Top Quality line

It's good to know where you can find these unusual sizes in plain head Socket Screws, accurately made of alloy steel by modern methods—double heat treated to obtain desirable physical properties — and shipped with *threads protected.*

write for prices and delivery information

. . . In the standard range of sizes Cleveland makes plain and knurled regular Socket Heads and Flat Socket Heads. Also a wide range of sizes in Hexagon, Flat and Fillister Head Cap Screws, Square Head Set Screws, and Milled Studs.

CLEVELAND Top Quality FASTENERS

THE CLEVELAND CAP SCREW COMPANY
2917 East 79th Street, Cleveland 4, Ohio

originators of the Kaufman DOUBLE EXTRUSION Process

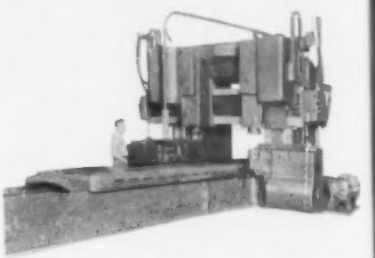
Ask your jobber for Cleveland Fasteners

—New Equipment—

Continued

Improved miller

Increased strength and rigidity of side head and rail support of the new planer type miller are due to new straight line housings with 27-in. faces and a full depth strength straight line outer wall instead of the old dog leg outer wall. Oversize square locks on housings and cross rail absorb greatly increased feeding pressures when cutting in the forward or reverse



directions. Dovetails have been eliminated. All gibs, plates and bearings are faced with laminated plastic plates. Non-metallic table ways can be furnished as an extra feature. New 14-in. quill travel increases the effective machining range of any size machine. Spindle speeds range from 10 to 1000 rpm in 21 speed changes. Power rail feed is a standard feature on double-housing millers. *G. A. Gray Co.*

For more data circle No. 24 on postcard, p. 133.

Extended conversations

A number of persons in widely separated cities reportedly can carry on a telephone conversation by means of an electronic device which looks like a small radio. A rest on top of the instrument holds the telephone receiver mouthpiece, and a round rubber piece on the back takes the other end of the receiver. This Convert-A-Phone magnifies the voice or the voices at the other end of the phone. A group of people sitting at a table several feet away can speak in ordinary tones and those at the other end can hear and answer them. There are no wires connected to the telephone; the connection is made when the receiver is placed on the device. *Convert-A-Phone Co.*

For more data circle No. 25 on postcard, p. 133.

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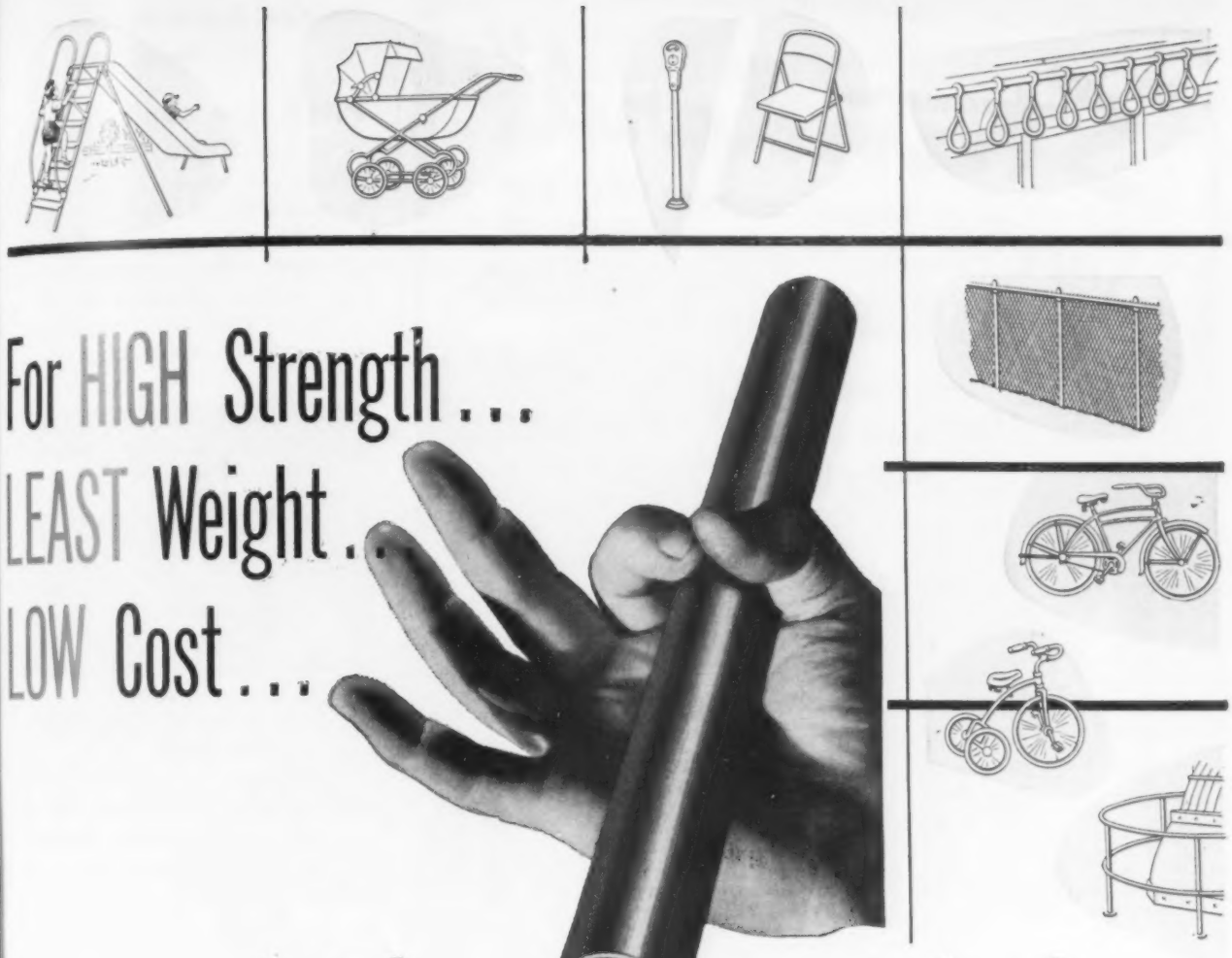

For HIGH Strength...
LEAST Weight...
LOW Cost...

A tube every time!

As simple as two plus two. When you want the *most* strength with the *least* weight—use a tube. In proportion to size and weight, it's the strongest structural form you can buy.

Think about some of the applications of NATIONAL Electric Welded Mechanical Steel Tubing; applications where sturdiness with lightness is mandatory—playground equipment, metal furniture, seat frames, fence posts, guard rails, lighting fixtures, and hundreds of mechanical applications like automobile tail pipes, shot hole casing, and flue tubes for water heaters. And junior's bicycle. How could he possibly manage it if it were built of *solid steel?* And motorcycles? And baby carriages?

Steel tubing is rigid. It has high resistance to torsional and bending stresses. It's easy to transport, easy to fabricate. The smooth surface requires a minimum of paint or other decorative finish.

For good commercial quality mechanical steel tubing at low cost, specify—or rather, insist on—NATIONAL. It is available in sizes up to and including 4" OD. Easy to bend, easy to form, it is made by the world's largest manufacturer of steel tubular products.

Our engineers will gladly share with you their experience in the applications of NATIONAL Electric Welded Mechanical Steel Tubing. Write to National Tube Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

NATIONAL Electric Welded MECHANICAL STEEL TUBING

UNITED STATES STEEL

"Standard"

Serves Manufacturers Who Use All Shapes and Sizes of

MECHANICAL STEEL TUBING

SIZE AND THICKNESS CHART

of Electric Weld Tubing for Mechanical Use

TUBE DIAMETER	MAXIMUM WALL		MINIMUM WALL	
*O.D. SIZE	DECIMAL	B. W. GAUGE	DECIMAL	B. W. GAUGE
1/2"	.065"	16	.028"	22
5/8"	.065"	16	.028"	22
3/4"	.065"	16	.028"	22
7/8"	.083"	14	.028"	22
1"	.109"	12	.028"	22
1 1/8"	.109"	12	.028"	22
1 1/4"	.134"	10	.028"	22
1 3/8"	.134"	10	.028"	22
1 1/2"	.148"	9	.035"	20
1 5/8"	.148"	9	.035"	20
1 3/4"	.148"	9	.035"	20
1 7/8"	.165"	8	.035"	20
2"	.165"	8	.035"	20
2 1/4"	.180"	7	.035"	20
2 1/2"	.203"	6	.035"	20
2 3/4"	.203"	6	.035"	20
3"	.220"	5	.049"	18
3 1/4"	.220"	5	.049"	18
3 1/2"	.238"	4	.049"	18
3 3/4"	.238"	4	.049"	18
3 7/8"	.238"	4	.049"	18
4"	.238"	4	.049"	18
4 1/4"	.250"	3	.049"	18
4 1/2"	.250"	3	.065"	16
4 3/4"	.250"	3	.083"	14
5"	.180"	7	.083"	14
5 1/2"	.180"	7	.083"	14

*Intermediate sizes within the range indicated can also be manufactured. Please consult us for sizes not listed.

Manufacturers requiring tubing for civilian or defense production prefer "Standard's" Electric Weld Steel Tubing for many reasons! "Standard's" Electric Weld is produced in one of the most versatile and complete mills of its kind in the world. "Standard's" 33 years of specialized tubing "know-how", and monthly production of millions of feet of stainless and carbon steel tubing, in wide range of sizes and gauges, assure you of utmost satisfaction. No problem of tolerance, precision or severest application for mechanical, structural, or pressure tubing is too difficult.

STAINLESS STEEL TUBING
⅛" to 3" O.D. . . . .028 to .095 wall

ABOVE CHART COVERS ROUND CARBON STEEL TUBING . . .

EQUIVALENT SQUARES, RECTANGULARS AND SPECIAL SHAPES ARE ALSO AVAILABLE.

THE STANDARD TUBE CO.

Detroit 28, Michigan

Welded Tubing — Fabricated Parts

STANDARDIZE with STANDARD — It Pays

—New Equipment—

Continued

Pitch line control

Pitch line concentricity arbors and chucks are offered as the answer to machining and inspection problems where there must be control of close tolerances from spline pitch diameters to face, shoulders, bores and external or internal pitch dimension of gears. They are engineered for customers' application, whether spindle mounted, face plate, between centers, or inspection gages and designed to be manually or draw-bar operated. An aircraft firm reported that on a gear 5-in. OD, ⅝ in. face with splined bore it was able to repeat within 0.0003 (tenths) of gear tooth PD. *Splinemaster Products Div., Great Lakes Broach, Inc.*

For more data circle No. 26 on postcard, p. 133.

Welding benches

New welding bench is constructed to stand sturdily by itself without end or wall support. Top measures 36½ in. square, can have fire brick easily and conveniently installed on it. Bench is standard height of 33⅝ in. and comes equipped with bench drawer 18x 22x5 in. and a shelf with partitions for holding welding rods. *Industrial Bench & Equipment Mfg. Co.*

For more data circle No. 27 on postcard, p. 133.

Turn to Page 146

THE BURLINGTON LIARS' CLUB
SPINS A YARN FOR BAKER'S MAGDOLITE

FINDERS KEEPERS

After going to bed one night, a G.I. stationed in Japan, heard the barracks door open. Assuming the noise was made by some of his buddies returning, he paid no attention to it. Suddenly, two large shadows fell across his cot and he looked up. Standing beside him were two mosquitoes well over six feet tall!

Too frightened to move, the G.I. lay there petrified while the mosquitoes spoke: "Shall we eat him here or take him home?" said one. "Don't be silly", replied the other. "You know very well if we carry him home the big mosquitoes will take him away from us!"

"Finders Keepers", the title of this story, reminds us of our customers. Once they *find* out how good BAKER'S MAGDOLITE is, they *keep* ordering it again and again.

Why don't you join the long list of satisfied customers who have learned to rely on BAKER'S MAGDOLITE—the original dead-burned dolomite? Try it . . . find how its superior chemical, physical, and mineralogical composition assures ingot uniformity and reduces maintenance costs. We know you'll keep specifying BAKER'S MAGDOLITE, the dolomite which continued research has made 5 ways better: Composition, Preparation, Economy, Strength, Quality.

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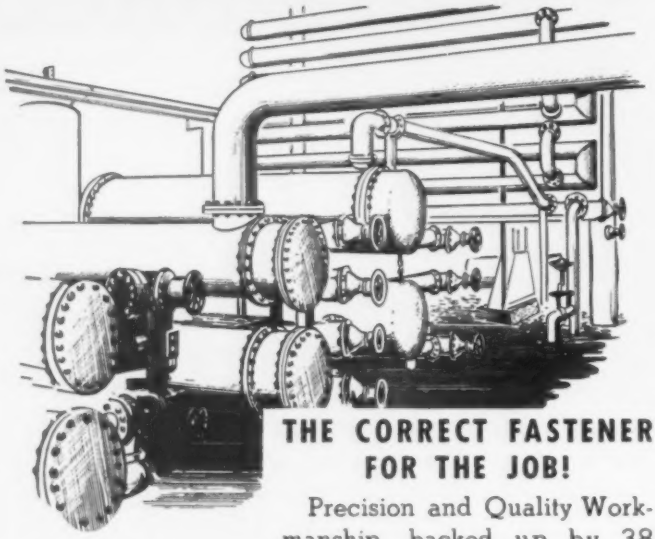
JEBCO
PRODUCTS
SINCE 1889
MAKERS OF BAKER'S MAGDOLITE

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA

Plants: York, Billmeyer, Pennsylvania—Millersville, Ohio

For DEPENDABILITY IN REFINERY EQUIPMENT



THE CORRECT FASTENER FOR THE JOB!

Precision and Quality Workmanship, backed up by 38 years of Erie experience, are yours for thoughtful buying. Whether you require a fastener made from carbon, alloy or stainless steels, to special design, to exacting specifications, Erie fasteners will save you time and expense . . . from your planning, to procurement, to fabrication. Submit your fastener requirements to us, Erie Service will meet the challenge.

A SUBSIDIARY OF Barium STEEL CORPORATION Steelmaking to the Nation

ERIE BOLT and NUT CO.

ERIE • PENNSYLVANIA

STUDS • BOLTS • NUTS
ALLOYS • STAINLESS
CARBON • BRONZE

Representatives in Principal Cities.

Copying machine

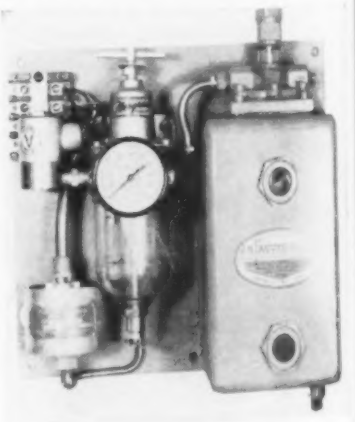
Only slightly larger than a typewriter, a small office copying machine brings speed and savings of direct copies within easy reach of every office. The Ozalid Bambino will copy letter, accounting state-

ments and reports—anything, in fact, that is written, typed, printed or drawn on a sheet of translucent paper up to 9 in. wide, any length. A first copy is ready in seconds; up to 200 copies can be made in an hour. *Ozalid, Div. General Aniline & Film Corp.*

For more data circle No. 28 on postcard, p. 121.

Oiling system

Automatic oiling system for plain bearings, ball and roller bearings, V's, slides, ways, rollers, cams, chains, gears and transmissions applies a constant and uniform oil film to groups of bearings. Oil-Air



atomizes oil into microscopic particles which are carried in the airstream and distributed through tubing to the bearings. Oil-Air has no moving parts; it operates solely on compressed air. *J. N. Fauver Co., Inc.*

For more data circle No. 29 on postcard, p. 121.

Turn to Page 148

Do you know these facts about vanadium?

Vanadium is available in quantities for every application.

Ferrovanadium is one of the most versatile, economical ferro alloys. It gives new life and endurance to virtually every type of alloy steel and iron. Its applications range from watch springs to giant forgings. *And a little goes a long way,* with small additions often doing the work of large additions of other alloys.

Through a long-range program of planned expansion, Vanadium Corporation has played a leading role in keeping vanadium available. Latest results of this program . . .

VCA mines in the U.S. and overseas offer a reliable, growing source of the finest vanadium ore.

New and enlarged facilities at the VCA plant at Cambridge, Ohio, assure a plentiful supply of highest-quality Vancoram Ferrovanadium for every iron and steel application.*

In the years ahead, Vanadium Corporation will continue to keep ahead of the growing demand for vanadium throughout American industry—producing increased quantities of Vancoram Ferrovanadium for both military and civilian use.

**For greater shipping economy and ease of handling, Vancoram Ferrovanadium can be furnished in palletized form.*

Producers of alloys VANCORAM BRAND metals and chemicals

VANADIUM CORPORATION OF AMERICA

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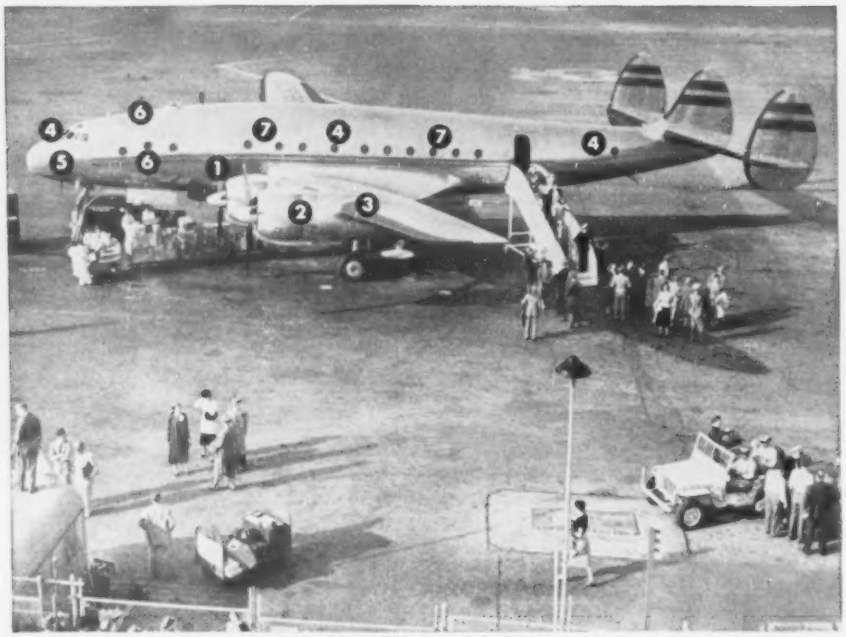
METALS



When parts must function repeatedly without fail, aircraft designers specify beryllium copper, a unique alloy with a multitude of desirable properties. This Lockheed Constellation serves to show where beryllium copper parts can be found in many modern airliners. For parts, see below.

VERSATILE BERYLLIUM COPPER

The aircraft industry makes wide use of this alloy's ability to do many jobs

In World War II, Berylco beryllium copper was drafted for the production war on many fronts. It did amazingly well. For aircraft, it improved such things as radar equipment, altimeters, valve guides, plug type connectors.

Today Berylco beryllium copper is an engineering material in wide demand—one of growing value to the aircraft industry. It is being used more and more for critical engine parts, from bushings to jet fuel pumps. Its use results in better airframe components as well as more accurate instruments. It helps solve increasingly tough radar and electronics problems.

In fact, nearly every industry today is aware of the part Berylco can play in making better, cheaper products. By offering the designer combinations of such desirable properties as elasticity, fatigue resistance, strength and conductivity, Berylco can often solve design problems involving conflicting requirements. And it can do so at low cost and with the utmost reliability.

The supply picture today is brighter than ever before. Now you can be certain of getting the material you need for *your* application. You can also, for the cost of a phone call, get the know-how and experience of the world's largest producer of beryllium copper. For full information, address your inquiry to THE BERYLLIUM CORPORATION, Dept. 3-I, Reading 6, Pa.

Tomorrow's products are planned today—with Berylco beryllium copper

These Berylco parts—a few of those used in modern planes—are numbered to indicate where they appear in the large photograph. (1) Propeller bolts; (2) fuel injector; (3) de-icing stud; (4) instrument switch part; (5) instrument diaphragm; (6) connectors, plug-type and coaxial; (7) safety belt release.

Web-thinning device

Web-thinning and drill grinding operations can be performed on a single machine, the Cawi-Spiral twist drill grinder when equipped with a new web-thinning attachment. Web-thinning operations are carried out on a second grinding wheel that is already incorporated for manual web-thinning on the

C-S grinders. A push-button indexing device turns the chuck and drill, after thinning one side of the web, so that the grinding wheel enters the reverse side of the drill in exactly the same position. Only a single chucking operation is needed for both grinding and web-thinning. *Kurt Orban Co., Inc.*

For more data circle No. 30 on postcard, p. 133.

Anchor bushings

Anchor bushings used in laminate plastic drill templates for contoured sheet metal parts effect cost savings for tool designers. Laminate plastics with imbedded anchor

bushings are shaped in the same die forms that produce sheet metal parts to be drilled, assuring a perfect match with the contoured parts. Triangular and rectangular styles are available. *Hi-Shear Rivet Tool Co.*

For more data circle No. 31 on postcard, p. 133.

Measures roughness

Six Profilometer LE-type tracers take surface roughness measurements on holes as small as ½ in. ID, 24 in. deep, and from 1 to 75 microinches roughness. To enter small, deep holes, the tracers have

an integral Linkarm or Stiffarm, each available in three standard lengths for measuring maximum depths of 9, 18 and 24 in. All tracers can be used with any Profilometer Amplimeter. *Micrometrical Mfg. Co.*

For more data circle No. 32 on postcard, p. 133.

Hand cleaner

Velvety, a jellytype hand cleaner, dissolves and removes grease, soil, paint, tar, etc., from workmen's hands by rubbing a small quantity of it over the skin for several seconds. The cleaner can be wiped or rinsed off the hands, leaving the skin clean and soft. The compound contains Lanolin, possesses no odor. *Ducar Chemical Products Co.*

For more data circle No. 33 on postcard, p. 133.

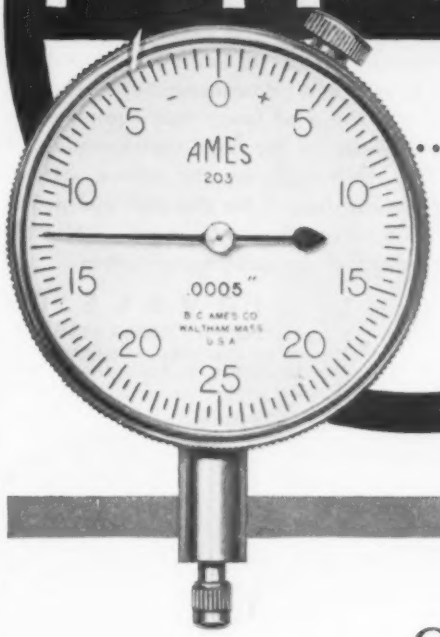
Slide-rule pencil

New slide-rule pencil writes in two colors, calculates, and magnifies. It also combines in the handy instrument a collapsing measuring scale, a fine print magnifier, depth gage, detachable ruling edge, concealed

eraser and spare leads, a plain and enlarging cursor for the slide rule's nine scales, and an optical pocket clip. It is made of plastic and heavily-plated metal parts. Device is 6½ in. long, weighs 1 oz. *Device Development Co.*

For more data circle No. 34 on postcard, p. 133.

AMES



...the preferred Dial Indicators

One of America's largest and most famous mass-producers recently chose Ames as preferred source of supply for indicator gauges.

The reasons behind this decision are the very reasons why *you* should standardize on Ames dial indicators and dial gauges:—the Ames "Hundred Series" indicators available in four sizes, fit every measuring requirement; they are *accurate, sensitive,* low in friction, yet are *rugged* and *tough*—give *more* on-the-job time. All Ames products embody latest design and highest-quality materials; they are manufactured by methods and machines that are *exclusive* with B. C. Ames Co.

Ames Dial Depth Gauge No. 11C

Ames Dial Micrometer No. 517

Ames Amplifying Dial Comparator No. 26

Ames Small Hole Gauge No. 36

Send today for your free copy of Catalog No. 58

Representatives in principal cities. B. C. AMES CO. *25 Ames Street Waltham 54, Mass.*

Mfgr. of Micrometer Dial Gauges • Micrometer Dial Indicators

PRECISION FINISH THAT WITHSTANDS PUNISHING PRESSURES

MIDVALE STEEL ROLLS

Pressure Vessels

Turbine and Generator Shafts

Hardened and Ground Steel Rolls

Corrosion and Heat Resisting Castings

Ordnance and Armor

Rolls for tin plate, strip or sheet mills . . . precision rolling of copper, aluminum . . . or other metals . . . they are a specialty with Midvale. The years of experience and craftsmanship in making hardened and ground forged steel rolls —from furnace to finish grind—assures rolls unsurpassed in quality and performance.

If you need heavy steel equipment of any type, look to Midvale for the finest craftsmanship. Rolls for steel mills . . . roll shells for the mining and cement industry . . . pressure vessels for chemical and petroleum industries . . . rings for turbines and gears . . . Midvale makes them all to your most exacting specifications.

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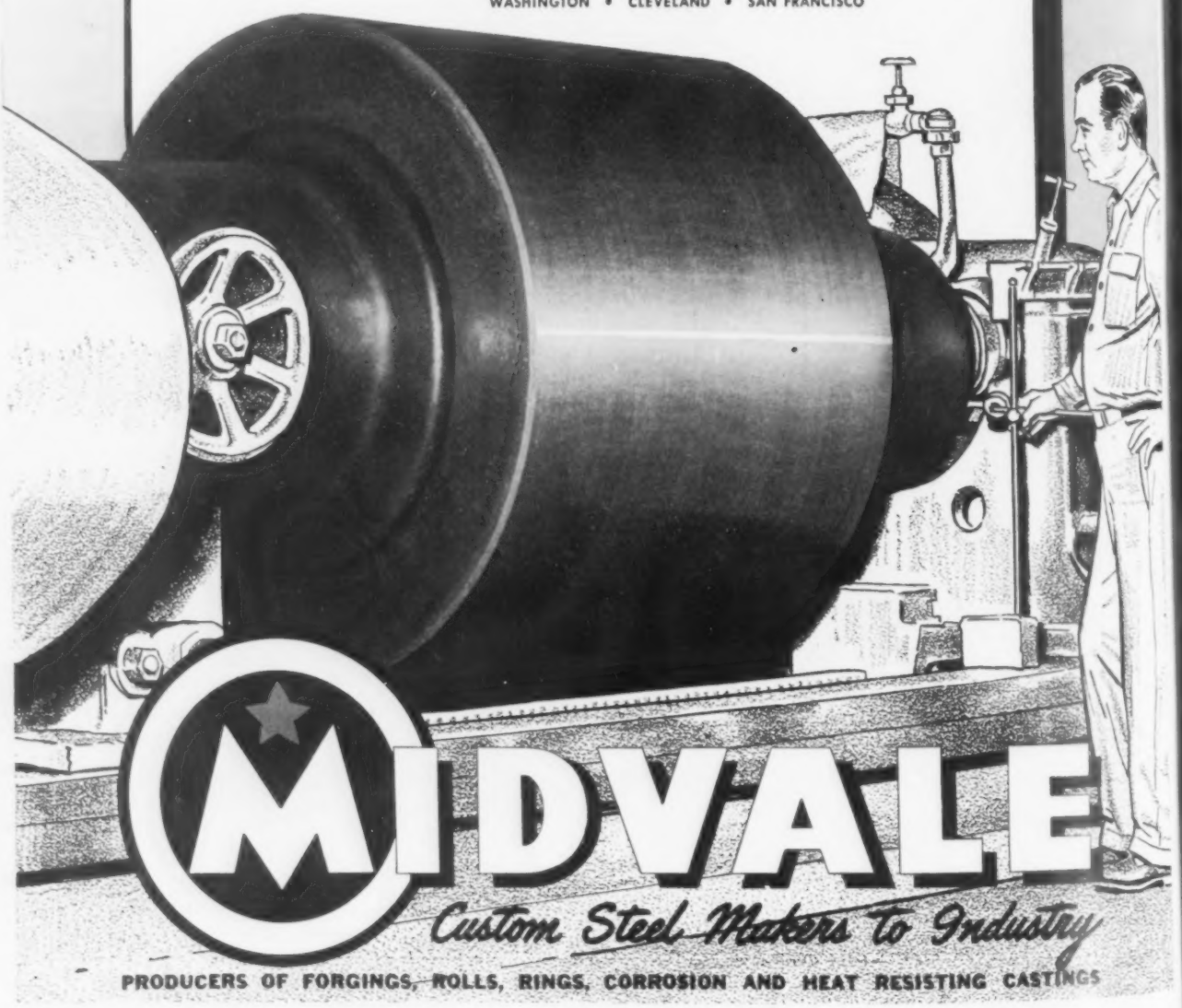
OFFICES: NEW YORK • CHICAGO • PITTSBURGH
WASHINGTON • CLEVELAND • SAN FRANCISCO



MIDVALE

Custom Steel Makers to Industry

PRODUCERS OF FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

The Iron Age

SALUTES

Roger Gay

Prime mover in both his firm and ASA, he has strong convictions on public and community relations.

ROGER GAY leads a double life—and thrives on it. As president of The Bristol Brass Corp. of Bristol, Conn., he is chiefly responsible for his company's multi-million dollar modernization and expansion program.

As president of the American Standards Assn. he has been a tireless salesman for the idea of cooperatively established standards for the mutual benefit of both producer and consumer.

A strong believer in executive leadership in public and community relations, he recently summed up his conviction by saying:

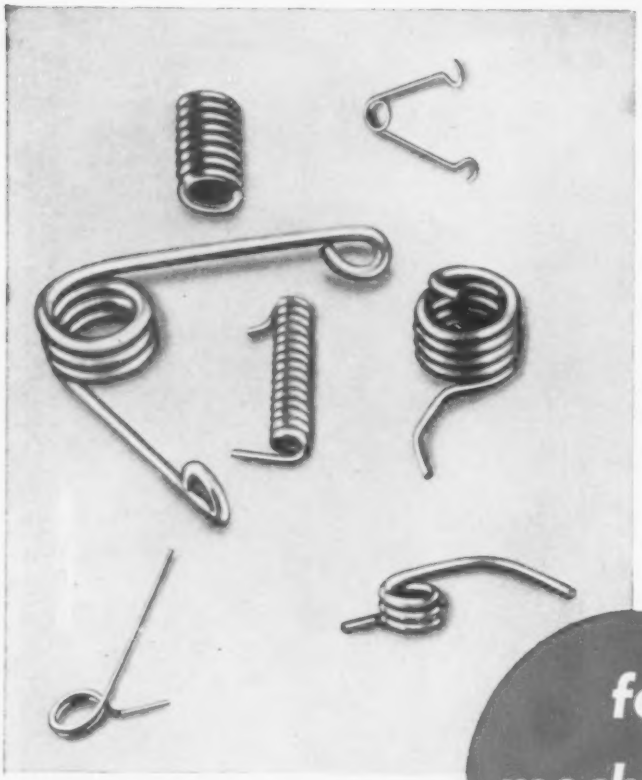
"You can delegate the execution of policy, you can have a public relations department numbering 30 people, but you yourself have to act with public relations sense and make company decisions which are in the public interest."

He has his own program for business leaders: Render high caliber public service; participate in community affairs; earn the reputation of good industrial neighbors; take the lead in discussions of city, state and federal economics; talk in terms people will understand.

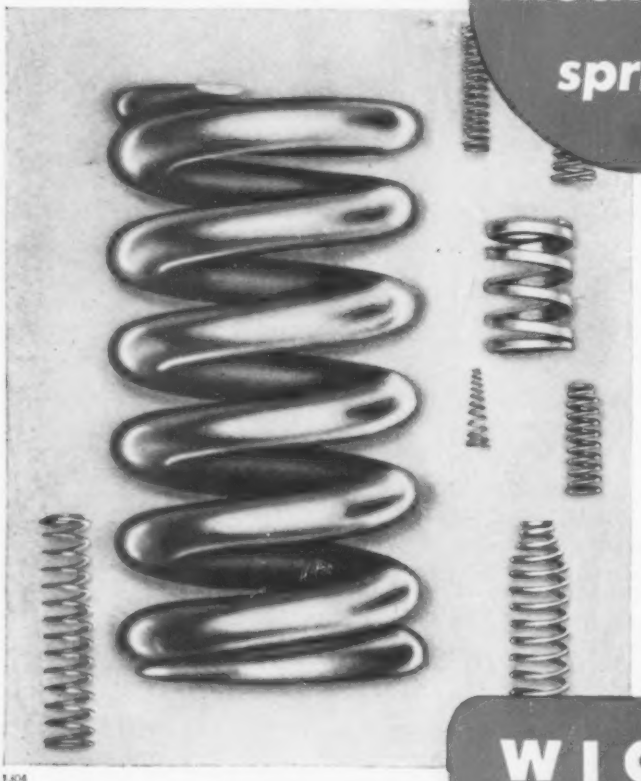
A Harvard graduate, Roger started his business career in the mill of American Brass Co. at Waterbury, Conn., in 1926. He shifted to sales and was eventually assistant sales manager for American Brass.

In 1938 he was brought to Bristol Brass as assistant to the president. Made president during World War II, he served on copper and brass industry advisory groups, used his knowledge to develop Bristol's postwar development program.

WICKWIRE WIRE



for mechanical springs



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The Iron Age

INTRODUCES

Ray P. Powers, elected vice-president, PACKARD MOTOR CAR CO., Detroit.

Arthur F. Vinson, elected a vice-president, GENERAL ELECTRIC CO., Schenectady.

Austin Goodyear, elected a vice-president, HEWITT-ROBINS, INC., Stamford, Conn.

G. E. Burks, becomes director of engineering, CATERPILLAR TRACTOR CO., Peoria; **Johne E. Jass,** becomes chief engineer; **Paul B. Benner,** becomes assistant chief engineer; and **Carl L. Kepner,** becomes assistant chief engineer.

Thomas G. Bradley, appointed director of sales and promotion, PFIZER LABORATORIES, a division of Chas. Pfizer & Co.; and **Arthur C. Emelin,** named director of operations.

Theodore C. Smolinski, appointed director of technical service, WAGNER BROTHERS, INC., Detroit.

Robert E. Dillon, elected a director, BUFFALO-ECLIPSE CORP., North Tonawanda, N. Y.

Donald H. Campbell, named comptroller, RIGIDIZED METALS CORP., Buffalo.

W. L. Neely and **John T. Farrell,** appointed assistant controllers, ROCKWELL MFG. CO., Pittsburgh.

A. J. Jones, named chief engineer, LANDIS TOOL CO., Waynesboro, Pa.

Patrick H. Norton, joins sales engineering staff, FREDERIC B. STEVENS, INC., Detroit.

Dr. Edward L. Kropa, becomes chief chemical consultant, BATTELLE INSTITUTE, Columbus, Ohio.

Clark Langworthy, appointed chief engineer for industrial hydraulic products, THE PARKER APPLIANCE CO., Cleveland.

James E. Gathings and **Jon Chiesel,** named power transmission and conveying chain sales engineers, Dallas and Chicago offices, WHITNEY CHAIN CO.

Darwin S. Weist, appointed chief engineer, ST. PAUL HYDRAULIC HOIST, Minneapolis.

George C. Steyskal, becomes head of new Service Dept., STANDARD TOOL & MFG. CO.

Jack E. Lawson, appointed to head sales, Detroit area, CIRCO EQUIPMENT CO.

Newton H. Willis, appointed manager, Railway Div., WAUKESHA MOTOR CO., Waukesha, Wis.

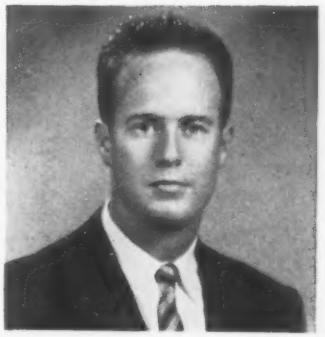
Judson Neff, named manager all manufacturing and production operations, Pittsburgh and Midland, Pa., plants, as well as manager of the engineering and estimating departments, MACKINTOSH-HEMPHILL CO.

Joseph H. Pargeter, now heads the steel forge operations, WILLYS MOTORS INC., Toledo.

S. G. Kern, named manager, Denver office, KSM PRODUCTS, INC., Denver; and **Robert F. Chapman,** named manager, San Francisco office.

Charles E. St. Thomas, named manager-advertising and sales promotion, Carboloy Dept., GENERAL ELECTRIC CO.; and **Eugene J. Lenar** becomes engineer in the metallurgical process and quality control unit for permanent magnet materials, Edmore, Mich., plant.

Wilbert A. Rath, becomes member of Purchasing Dept., JACK & HEINTZ, INC., Cleveland.



MERRICK LEWIS, elected president, The Alliance Machine Co., Alliance, Ohio.

JOHN H. ELLIOTT, named vice-president-steel operations, U. S. Steel Corp.

THEODORE H. BOOTH, appointed vice-president, The Carborundum Co., Niagara Falls, N. Y.

Ray Kensel, named district sales manager, Cleco Air Tool Div., REED ROLLER BIT CO., Detroit.

Bernard A. Shrive, named superintendent, Electrical Maintenance Dept., KAISER STEEL CORP., Fontana, Calif.

Edward G. Bartelmas, named foundry superintendent, McKINLEY METALS, Ft. Worth, Texas.

Quentin E. Charlesworth, appointed works manager, BRISTOL STEEL & IRON WORKS, INC., Bristol, Va.

Laurence W. Scott, joins consumer products staff, WESTINGHOUSE ELECTRIC CORP., Pittsburgh.

A. B. Capron, named assistant works manager in charge of the tube mills and engineering, Tubular Products Div., THE BABCOCK & WILCOX CO., Beaver Falls, Pa.; and **Newell Hamilton**, appointed manager of steel operations.

David C. Eisendrath, becomes works manager, PHEOLL MFG. CO., Chicago.

William H. Yeckley, becomes general manager of steel operations, THE YOUNGSTOWN SHEET & TUBE CO., Younstown.

C. A. Brashares and **Richard S. Moore**, named assistant general sales managers, HARBISON - WALKER REFRACTORIES CO., Pittsburgh; **George M. Ullom**, appointed sales manager, Birmingham District; and **Joseph D. Custer**, named sales manager, Portsmouth, Ohio district.

Albert L. Smith, named general manager, Walsh Portland Div., South Portland, Me., CONTINENTAL COPPER & STEEL INDUSTRIES, INC.

Dean M. Cochran, appointed assistant sales manager, THE HYDRAULIC PRESS MFG. CO., Mt. Gilead, Ohio.

H. H. Marsales, named general traffic manager, Eastern Div., THE COLORADO FUEL & IRON CORP., New York.

S. M. JENKS, appointed to newly-created post of assistant executive vice-president-operations, U. S. Steel Corp., Pittsburgh.

J. L. WAGONER, becomes vice-president and national sales manager, Multi-Amp Corp

E. H. H. GRAF, named vice-president in charge of sales, Detroit Broach Co., Rochester, Mich.

GORDON E. DEAN, elected a member of the board of directors, Fruehauf Trailer Co., New York.

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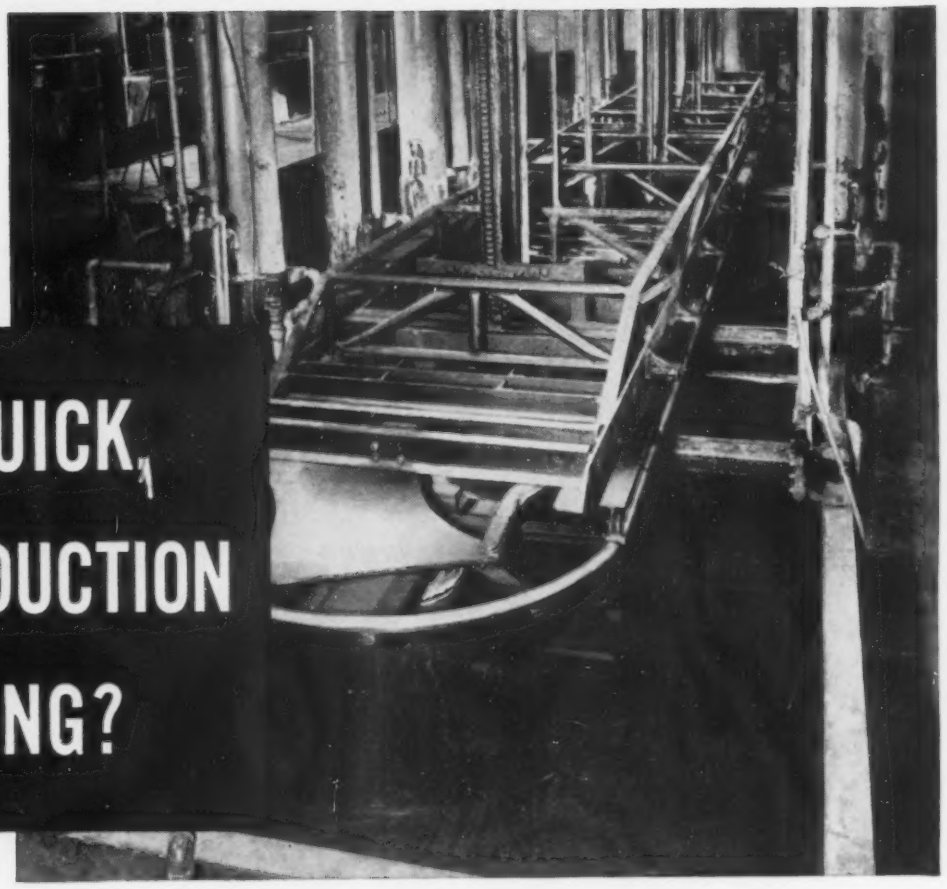

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—Personnel—

Continued

Laurin D. Woodworth, appointed general superintendent, Youngstown District Works, U. S. STEEL CORP., and **Oscar Pearson,** named assistant general superintendent.

E. A. Humble, named assistant manager, Boston office, ELLIOTT CO., Jeannette, Pa.; **M. C. Seeman,** named assistant manager, Cleveland; and **O. M. Sievert,** becomes assistant manager, Kansas City office.

John O'Connor III, named assistant sales manager, Cleveland district, COPPERWELD STEEL CO., Warren, Ohio.

Chandler C. Caton, appointed purchasing agent, THE BELMONT IRON WORKS, Philadelphia.

Harry R. Davis, appointed western district sales representative, REPUBLIC STEEL KITCHENS, Canton, Ohio.

Fred G. Littlejohn, appointed manufacturers' representative, HORTON CHUCK, Division of The E. Horton & Son Co., Windsor Locks, Conn.

Donald S. McCleary, named district purchasing agent, CONTINENTAL FOUNDRY & MACHINE CO., Pittsburgh.

Norwood Webster, named sales representative, New York area, RIVERSIDE METAL CO., Riverside, N. J.

OBITUARIES

John J. Siefen, president, J. J. Siefen Co., recently at his home in Detroit.

Myer Abelson, founder, Altoona Pipe & Steel Supply Co., recently.

A. Albert Kleir, 64, assistant director of research and development, Norton Co., Worcester, Mass., suddenly at his home.

Frank J. Winters, 62, associate editor in charge of editorial production for THE IRON AGE magazine, died on Sept. 3. A resident of Fairlawn, N. J., Mr. Winters joined THE IRON AGE 37 years ago as chief draftsman.

His career included positions as topographical draftsman, map expert for Sanborn Map Co., and statistical presentation expert for Hill Publishing Co. We deeply regret his loss.

The Iron Age
FOUNDED 1855
Technical Articles

"Plastic Alloys" Provide low cost, Corrosion-resistant finish

By W. G. Patton
Asst. Technical Editor

◆ Vinyl plastic coatings are being used for an increasing number of applications to replace highly alloyed ferrous and nonferrous alloys . . . Outstanding resistance to corrosion, remarkable toughness and resiliency are characteristic properties.

◆ New dipping techniques, new formulations and improved adhesives have greatly expanded the usefulness of these plastic materials . . . Typical applications and recent developments are described.

◆ VINYL PLASTISOLS, often called "plastic alloys," which first came to the aid of the metal working industry a few years ago as tough, resilient, corrosion resistant, insulating coatings for plating racks, have since found hundreds of new uses in the metal trades.

A variety of new potential applications indicates that plastisol formulations may eventually save thousands of pounds of precious alloying elements each year. The use of plastisol by means of a dip or spray application may provide a scratch-proof, cushion-like, corrosion resistant protective for the products of manufacturers who have yet to find a satisfactory answer to their special problems.

Typical applications of vinyl plastisols include acid, and alkali resisting coatings for conveyor hooks and baskets, coated handles for electrical tools, coated hoisting hooks, bumper protectors, abrasion resisting coatings for nuts, bolts, angle irons and similar metal parts. Many chemical dip or rinse tanks are plastisol lined to give long life and freedom from solution contamination. A plastisol lining has many advantages over other plastic-type linings, an important one being the fact that it forms a seamless barrier-type protective.

An auto manufacturer is using plastisol-coated plating barrels. An airplane manufacturer coats stainless steel wire trays with a vinyl plastisol that prevents scratching and resists vapor degreasing as well as acid and alkaline cleaners. Plastisol-lined pipe resists a broad range of corrosive agents.

Finish-machined transmission parts are being protected with vinyl plastisols. Fan blades

Plastisols, with remarkable corrosion and heat resistance properties, can be extruded, dip molded or dip coated . . .

that must resist strongly corrosive atmosphere as well as drainboards subject to strong corrosive attack are given longer life with plastisol coatings. Closely dimensioned wiring harness, Fig. 1, coated with plastisol to resist moisture and fungus, is being protected during forming by plastisol coated metal dies. Similar coated dies won't scratch the painted surfaces of instrument panels and other such items coated in the flat and formed as a final step. Microfinished fixtures for aircraft are being protected with a film of plastisol.

A pioneer in the application of plastisols, F. D. Pace Co., Grand Rapids, Mich., has been coating plating racks and similar equipment with vinyl plastisols since 1947. Plating racks as well as bumpers for the push carts in your neighborhood supermarket are regular production items at this plant. This company's application engineers, working closely with coating formulators and chemists of United Chromium, Inc., have jointly developed many formulations for specific application techniques to meet the special requirements of a dozen different industries including aircraft, electronic, automotive, small tools, dentistry, and surgery.

Vinyl dispersion plastisols are suspensions of resin in non-aqueous liquids which do not dissolve the resin at ordinary temperatures. They often include other ingredients such as stabilizers, pigments, fillers, etc. Plastisols require heat to fuse the material into a continuous film. These coatings differ completely from solution types containing volatile solvents where the film of resin forms, at least partially, by solvent evaporation. Plastisols contain no such volatile materials.

When the plastisol, a mixture of resins and a plasticizer, is heated to the proper temperature, the solid particles of resin dissolve in the liquid plasticizer. On cooling, a rubber-like alloy is formed. The word "plastisol" applies both to the liquid before it is cured by means of heat and also to the solid plastic alloy.

Vinyl plastics can be slush molded into hollow objects. They can be injection-molded or cast in open or closed molds. This rubber-like material with remarkable corrosion and heat-resistant properties can be extruded, dip molded or dip coated. It can be coated on paper or fabric, cast into sheet or spray coated

Dip coating is probably the most widely used method of applying plastisols today although injection-molding and spraying are moving into prominence. Details of many of the latest processes have not been released by the firms which developed them.

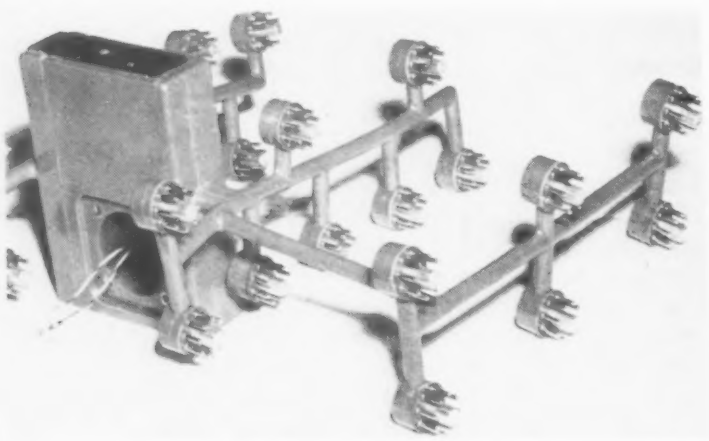

FIG. 1—Closely dimensioned electronic wiring harness coated with plastisol resists both fungus and moisture.

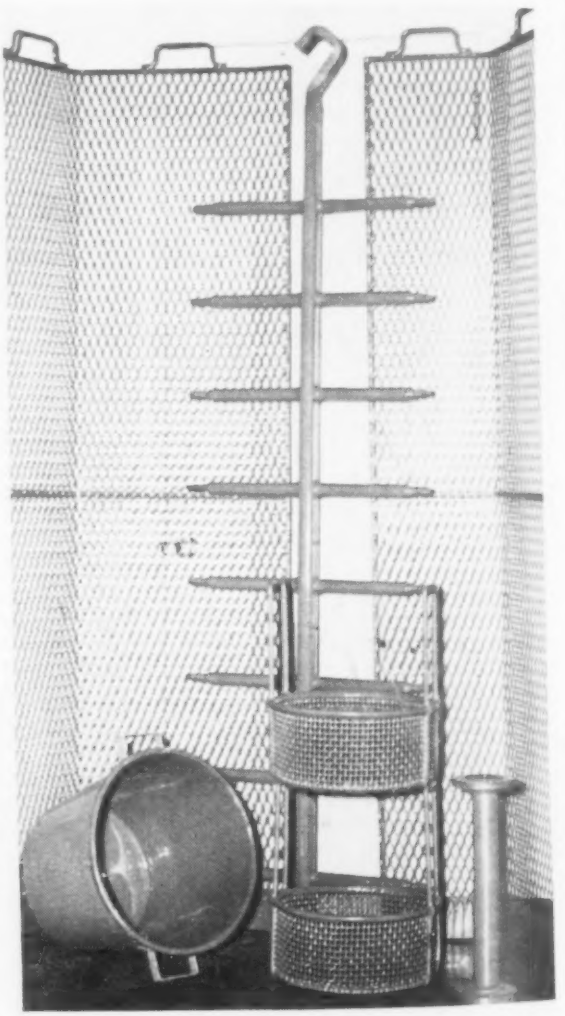

FIG. 2—Typical plastisol-coated screens, racks, baskets and other parts. They're used in industry and in your own kitchen.

After the liquid plastisol has taken the desired shape or form, heat is applied. This causes the resins, plasticizers and modifiers to fuse into a homogeneous mass.

Temperature is an important factor, controlling the nature of the product as well as the thickness of the coating. Curing temperatures generally range from 350°F to 375°F, although some special lower temperature formulations have been developed.

Some highly ingenious products have been produced by injection-molding vinyl plastisol, including a single molded piece of vinyl plastisol 9/16 in. thick with a 3/16 in. thick sandwich of three aluminum plates molded in. This so-called Magic Carpet controls the operation of a door in a manner similar to the photo-electric eye. Typical plastisol-coated screen, rack, basket and other parts are shown in Fig. 2.

Metal parts are being cast into plastisol for circuit breaker boxes and panel control boards. The plastisol acts as an insulator. Ability to use color identification makes the use of plastisols particularly attractive for electrical wiring.

Much development work has been done on dip-coating with vinyl plastisol. Where a thin coating is desired, the article is immersed at room temperature. After draining, it is cured or fused at 350°F to 375°F. Heavier coatings can be formed, either by preheating or re-dipping.

Special techniques in formulation, preheating and dipping have been developed to coat irregularly shaped parts. Sometimes immediate gelation of the deposit is necessary to prevent runs or tears. Plunging the heated part into hot oil, glycerine, or wax are familiar techniques. Im-

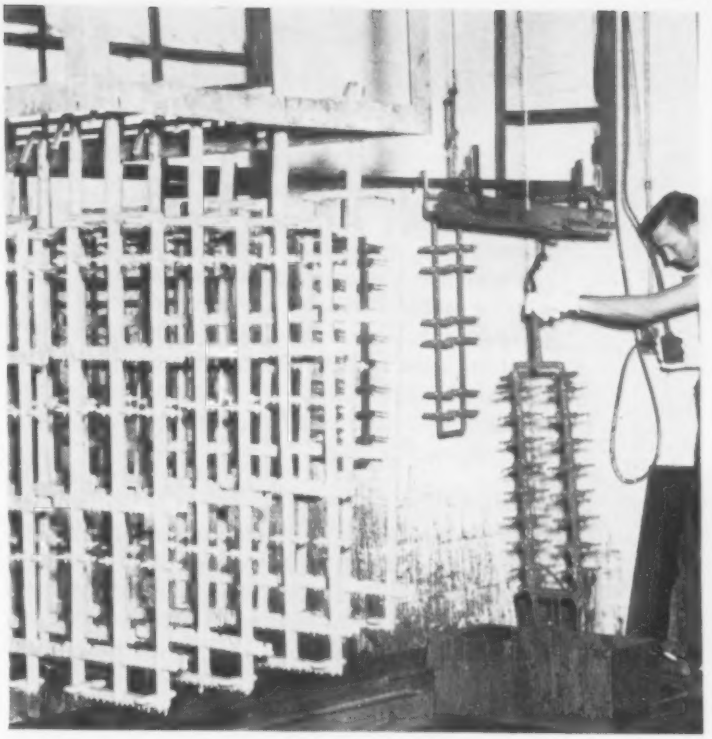

FIG. 3—Plastisol-coated plating tank frames and racks resist corrosion.

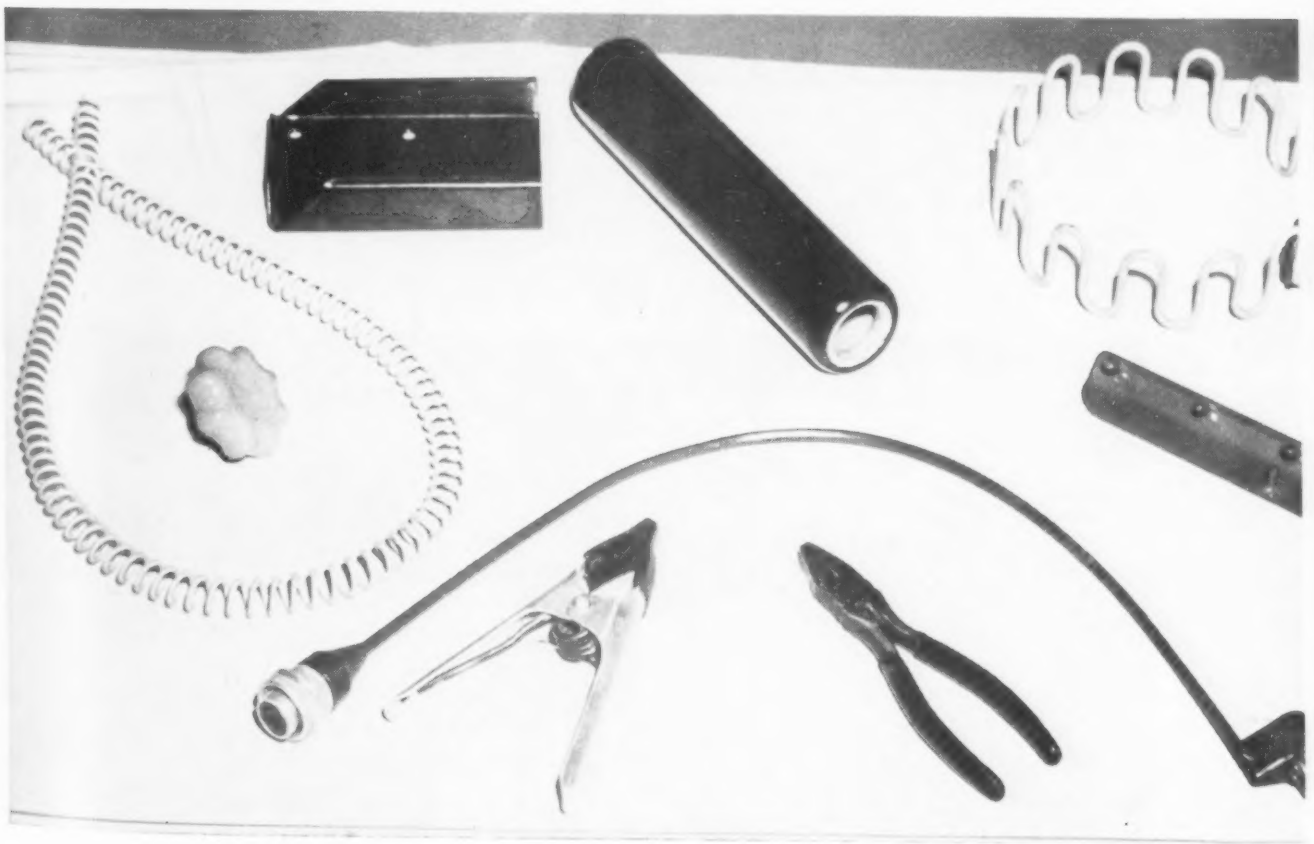

FIG. 4—Miscellaneous parts coated with plastisol, including pliers and clamps.

Many applications require special formulations to fit color, size and shape of part, handling and service conditions . . .

mersion rate and withdrawal rate in dipping is a factor in controlling film thickness and uniformity.

Vinyl plastisols, when cured, have no adhesion to metal surfaces. Where adhesion is required, specially formulated bonding primers must be used. A single coat primer, designated Unichrome 219-PX, is an outstanding product in the field. It promotes high vinyl to metal bond strength.

Coated dies salvage grilles

Availability of special equipment plus the development of many new coating techniques have enabled the F. D. Pace Co. to coat a variety of dissimilar metallic shapes. The tank diaphragm frames and rack, Fig. 3, are nearly 7 ft high. A basket 9 ft long, 3 ft wide and 2½ ft high, has been coated successfully.

Many unusual problems have been solved by Pace technicians. For example, an auto manufacturer had a large stock of radiator grilles on hand at the end of the model run. Dies were built to re-form the grilles to fit the new model. However, the dies could not be used because they scratch the finish. After coating the dies with plastisol of the right hardness and thickness, the chromium plated grilles were reformed without scratching.

Coatings for surgical instruments that failed because of their inability to withstand the action of steam and chemicals used in sterilizing have been replaced successfully with plastisol.

Several plating plants have extended the use of plastisol-coated plating racks to covering hooks on the conveyor system. An automobile producer is using plastisol-coated fender and body hoisting hooks. Coated handles for electrical tools like pliers, Fig. 4, are becoming popular.

Another interesting application of vinyl plastics by the F. D. Pace Co. is plastisol-lined metal pipe. Pacite-lined pipe is available for use in any diameter, in lengths up to 10 ft. The vinyl plastisol lining for pipe up to 3 in. diameter is usually ⅛ in. This is increased to 3/16 in. for larger pipe.

Of interest to stampers is the use of vinyl plastisol for forming dies. A coating of 0.020 to 0.030 in. can be applied to the working surface of metal forming dies without affecting the temper or the surface finish. As shown in Fig. 5, vinyl plastisol-coated dies are being used to form instrument panels for automobiles. The metal is formed *after* painting.

Another interesting application of vinyl plastisol is its use to protect aircraft assembly fixtures. The coating resists scratching and wear; the surface is also protected against corrosion.

Automatic feeding cuts costs

Automatic feeding of small parts for subassemblies has proved to be an effective approach to cost reduction. An automatic feeding hopper was coated successfully on the inside to provide protection for the surface finish of the hopper-fed parts.

Cost of vinyl plastisol materials varies with the individual formulations. Many applications require special formulations to fit color, size and shape of part, handling and anticipated service conditions. However, this "plastic alloy," often replacing expensive metal alloys, is furnishing a remarkable new "tool" to the metalworking trade at reasonable cost.

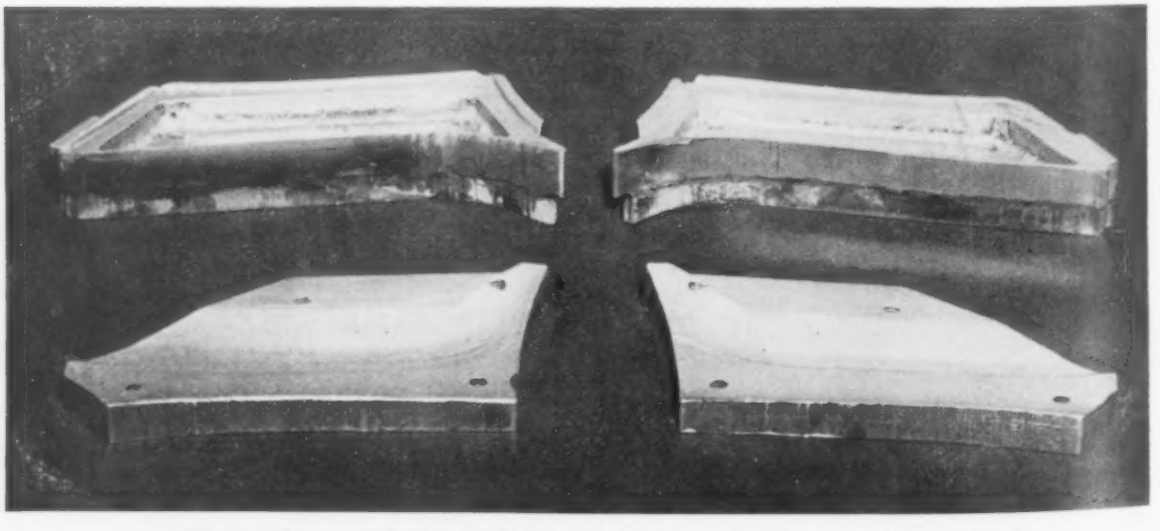

FIG. 5—Dies coated with vinyl plastisol can be used to form instrument panels.

STRETCH WRAP FORMING CUTS FABRICATING COSTS

Part II

By L. F. Spencer
Chief Metallurgist
Landers, Frary & Clark
New Britian, Conn.

◆ More and more shops are stretch wrap forming large parts from sheetmetal, extrusion or brake and roll formed sections . . . Aluminum, stainless steel, low-carbon and some alloy steels have been successfully formed.

◆ Important steps in the method are building and use of the forming dies . . . Kirksite, Masonite, hardwood, steel, cast dural plate, phenolic have been used successfully . . . Choice depends on suitability of the material for a specific application, length of run, and type of part being made.

◆ Proper lubrication is important to successful forming . . . Use a good quality high-pressure lubricant . . . In forming sheet, avoid excess lubricant which may become entrapped and cause blisters.

◆ DIES FOR STRETCH WRAP forming operations have been successfully made from a wide variety of materials. In the production of contoured sheetmetal dies, Kirksite, phenolic, Masonite, steel, cast dural plate and hardwood are frequently used. Choice of material is determined by economy and suitability for the specific application. Length of run and the type of material to be formed are other deciding factors.

Kirksite dies are used extensively to form aluminum alloys in various tempers, low-carbon steels such as SAE 1010 and 1020, a few alloy steels such as SAE 3140, and the austenitic stainless steels in various tempers. Kirksite, as a die material, is durable, casts easily to a specified shape and retains a high polish. Since Kirksite melts at a comparatively low temperature, about 800°F, it is easily reclaimed. Production of molds for casting the Kirksite shape differs somewhat from standard foundry practice.[2]

Cast phenolic dies (Rezolin 72S) are extremely economical since this material can be cast without going through the extensive die preparation needed in the casting Kirksite. This material can be used for forming various aluminum alloys and, where production requirements are low, for forming steel.

Both Masonite and hardwood are frequently used on production dies where the number of parts to be formed is relatively low. These materials can also be used for forming thin gage aluminum. Metal form blocks are used where part design embodies extreme contours and configurations. They are also more suited for mass production and forming of high tensile materials such as the stainless steels. In such cases, dies made from a low-carbon steel, such as SAE 1020 are frequently used.

Laminated stretch wrap forming dies, Fig. 5, are suitable for forming extrusions, rolled and brake formed sections. Although a variety of materials can be used in the production of these dies, steel is more widely used. Design will vary according to the section to be formed. Die components, Fig. 6, would include:

1. Die plate. This center section of the completed die is made to the desired contour and accepts all pressures during the forming of the part.

2. Backing plate. Serves as the base of the block and provides a surface to guide the workpiece into the die plate.

3. Pressure plate. Acts as a guide for shrink legs, as a stop for open "L" angles, and prevents the workpiece from sliding off the die plate.

4. Filler plate. Provides clearance between the die and pressure plate allowing the work to form without distortion and still prevent binding. Varies in thickness, allowing a clearance of from 0.002 in. for thin parts to several thousands for thicker sections.

Forming of a "Z" extruded section is shown in

In forming extrusions, where extremely close tolerances are required, annealed material should be used . . .

Fig. 6. Accessories facilitate forming and assure uniformity. Accessories include:

1. Joggle blocks. These form depressions or "joggles" in the workpiece. Their inclusion often eliminates additional handling for a secondary operation. In use, the part is first formed and, after the setting pressure has been applied, the positioned joggle blocks are forced against the workpiece.

2. Drill jigs. Commonly used to assure uniformity of hole positions in relation to trim lines and contour of the formed part. Accurate location holes are useful in assembly operations.

3. Scribe blocks. Furnish a true edge for scribbing trim lines on a part while it is still on the die. Saves time, insures accuracy and uniformity of marking.

4. Snakes. On light gage extrusions of brake formed sections, these prevent either collapse of the formed section as pressure is applied. These flexible filler pieces conform to the inner part contour to give maximum support. Fig. 7 illustrates the application of snakes in stretch wrap forming. Snakes are made from wood, Masonite, steel segments, Kirksite, red fiber, or low melting point alloys such as lead. Choice of material depends on the production run, the material to be formed and the contour.

Whether sheet, extrusions, rolled or brake formed sections are used, stretch wrap forming includes three basic operations.

1. A tensional load, applied by the jaws gripping the material at two ends, produces the initial stretch.

2. Wrapping action where either the section or sheet is positioned to the contour form of the die.

3. Application of the final setting pressure or tension while the part is still wrapped around the die.

Values of the variables such as springback and initial and final setting pressures are determined by trial and error. Springback is of particular importance since the tolerances are usually rather close; this precludes die correction procedures.

In forming extrusions and rolled or brake formed sections, the initial stretch pressure should be sufficient to avoid distortion of workpiece as well as to minimize springback after wrapping is completed. Magnitude of the pressure is usually determined on the basis of elongation on a 12-in. segment. Commercially, a 1 pct elongation is considered a satisfactory stretch for most parts.

Too low a pressure is indicated by wrinkling

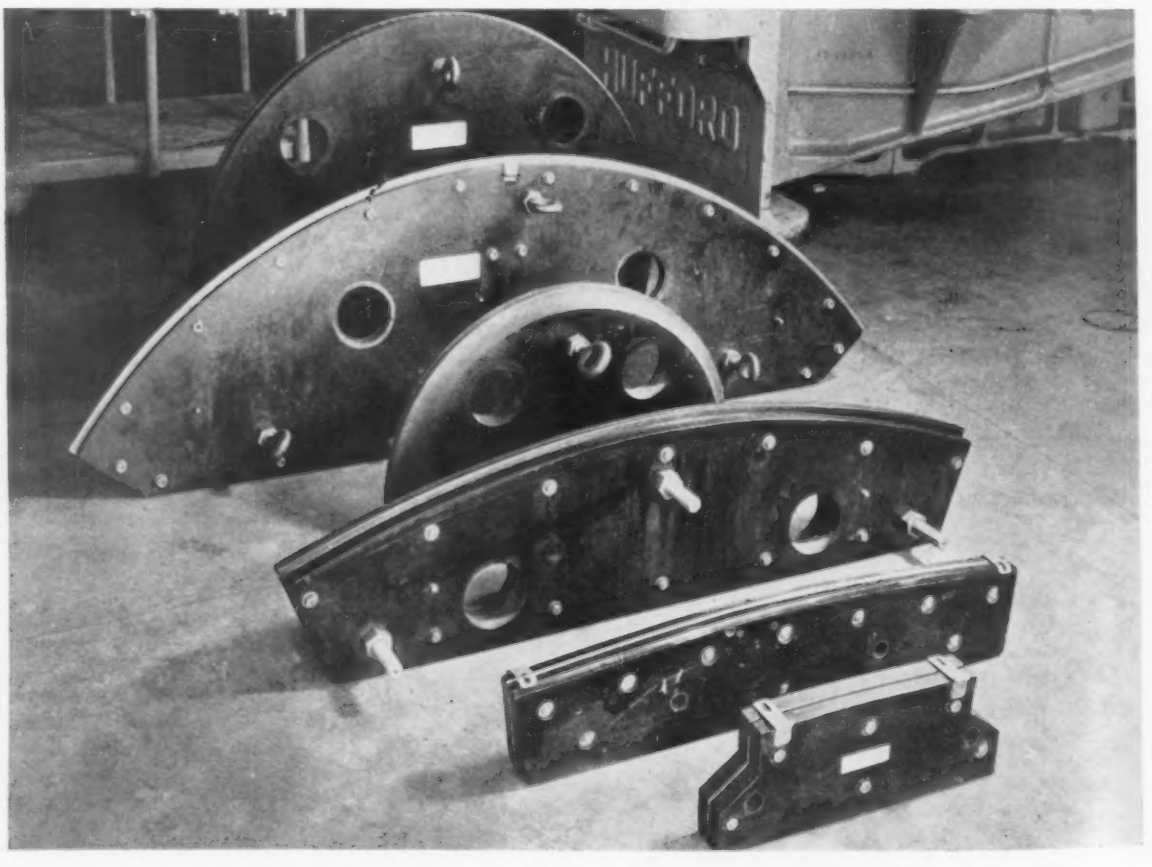

FIG. 6—Here are typical dies used for stretch wrap forming extruded sections.

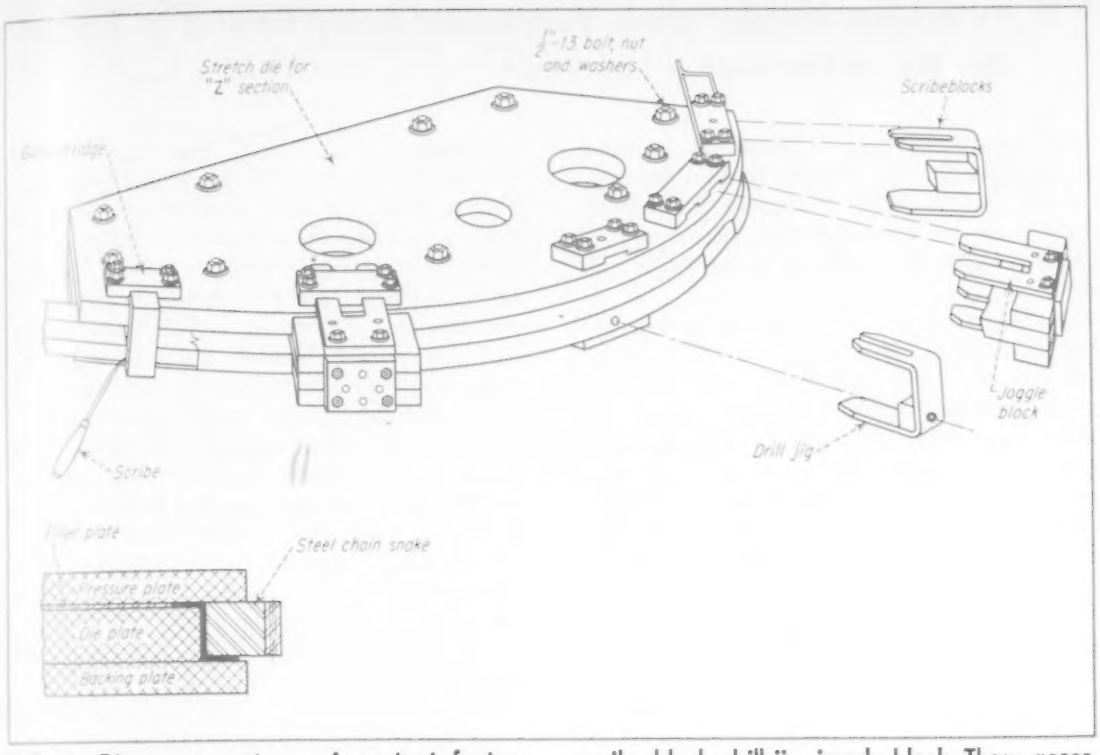

FIG. 6—Die components are important factor in reducing production costs. Typical parts are scribe block, drill jig, joggle block. These accessories facilitate forming.

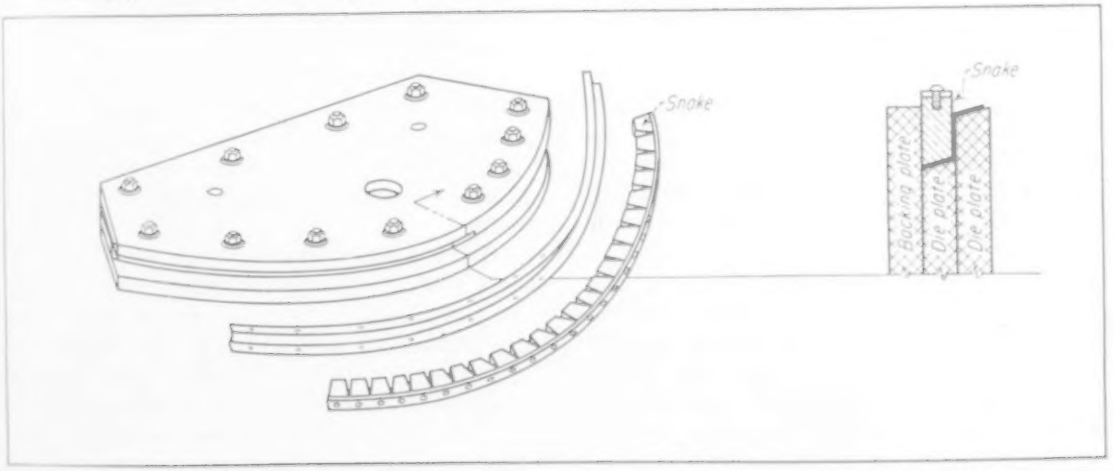

FIG. 7—Collapse of a light extrusion or brake or roll formed section during forming can be avoided by using snakes. Snake materials include wood, Masonite, and Kirksite.

of the inner flanges, out of "flat" contour, failure of the part to enter die properly, or a large amount of springback in the part when the jaws are released. Too high a pressure is indicated by breakage of the material before it has completely formed, or by breakage before any appreciable elongation resulted while applying the final setting pressure.

The final setting tension, which sets the contour and further reduces the springback, can also be judged to some extent by the elongation that has taken place within the section formed. A value of 4 pct elongation has been given as a satisfactory starting point. In evaluation of both initial and final pressures with a cycle, an experimental procedure to determine the exact values for any given part is in order.

Fig. 8 shows stretch forming of an extrusion. The part being formed in these photographs is a large "I" beam section structural for an airplane fuselage. The material is 75S; the part being formed first in the "O" condition, then heat treated and restretched in the as-quenched condition.

Cross-section of the part is approximately 6 sq in. The preform in "O" condition requires approximately 60 tons of pull, and the final stretching, a pull of approximately 120 tons. Fig. 8 illustrates the actual forming operation.

In forming extrusions, where extremely close tolerances are demanded, annealed material should be used. Thus, in the event that a heat treatable aluminum alloy composition is to be formed, the annealed temper is specified. The

To achieve uniform strain distribution during forming of a sheet, a thin film of lubricant is important . . .

material is then heat treated, placed on the same form die, and a final setting tension applied. Stretching after heat treatment eliminates springback so die correction is unnecessary. It also removes distortion arising in the heat treat cycle.

As is characteristic of the solution treated aluminum alloys, aging will occur. Factors such as the time period after quenching and the temperature at which aging will occur depend on the alloy used. If an alloy such as 24S has been solution treated, aging will occur at room temperature. This fact will dictate the use of refrigerating equipment to delay the age hardening tendency until after the final stretching operating has been performed.

This example does not imply that heat treated aluminum alloys cannot be stretch formed in either the quenched or aged condition. However, the degree of success will hinge on both the severity of the contour and the tolerance required in the finished shape. Sheets are now more frequently stretch formed in the S-T condition.

A lubricant must be used between die and material for successful stretch wrap forming, whether with extrusion or sheet. The lubrication reduces friction which may build up as the forming proceeds. A good quality, high pressure lubricant, similar to that used in deep drawing operations, can be used. In forming extrusions, frequency of application will depend on the final shape and the severity of contour.

To attain uniform strain distribution during forming of sheet, a thin film of lubricant is important. Excess lubricant may become trapped and cause blisters and bulges. Also, the importance of lubrication during stretch wrap forming increases as higher strength materials, such as the stainless steels, are formed. This is especially true in form dies with deep curvatures, involving sharp breaks at the ends.

It may be necessary in such cases to apply a heavier coating of lubricant at the form die radius to reduce friction at that point when final stretching pressure is applied. A rubber blanket, approximately ⅛ in. thick or a spun glass blanket can also be placed between the form block and the die.[5] These act much like a lubricant. The use of the blanket material will usually eliminate the necessity of the high surface finish on the form block usually required.

The stretch wrap forming of sheets usually has a greater latitude in material conditions. A typical form produced by this method is shown in Fig. 9; an aluminum alloy, 24S-T3 Alclad, is stretch wrap formed to a completed part with nonsymmetrical curvature. Material thickness was 0.081 in. and the blank size 16 x 120 in. An initial stretch pressure of 21 tons was used and final setting pressure was 34 tons.

The formed part, Fig. 10, has been produced from 75S-O aluminum. The material is solution treated and formed in the as-quench condition. The blank is 40 x 60 in. and initial stretching pressure is 16 tons. Final setting tension is 27 tons.

Very thin materials tend to rupture at the jaw inserts. The formed part, Fig. 10, 0.020 in. thick, is therefore formed in duplicate. Two sheets are placed together and clamped between the jaws. This double layer also doubles the pressures needed.

While satisfactory for thin sections having mild contours within the design, this method is not usually advisable in forming thicker sections, or in forming designs with deep contours. If double-layer material is formed, under these conditions, objectionable surface scratches, caused by friction between the two sheets, will form. Moreover, the outer sheet may not match the contour of the next assembly due to the increase in form die radii, caused by the inner sheet.

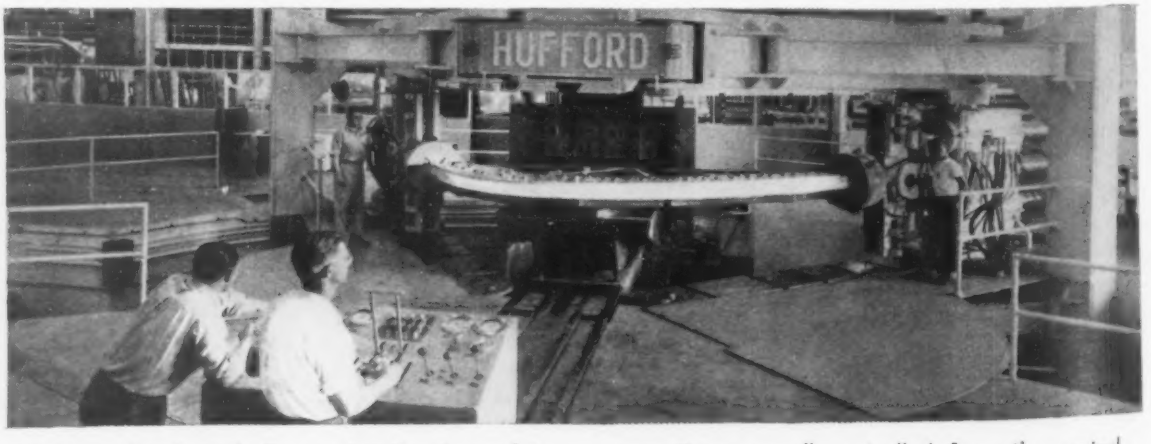

FIG. 8—Laminated die construction is used in forming this large aluminum extrusion. Machine operations are all controlled from the central panel, foreground. Part is "I" beam section.

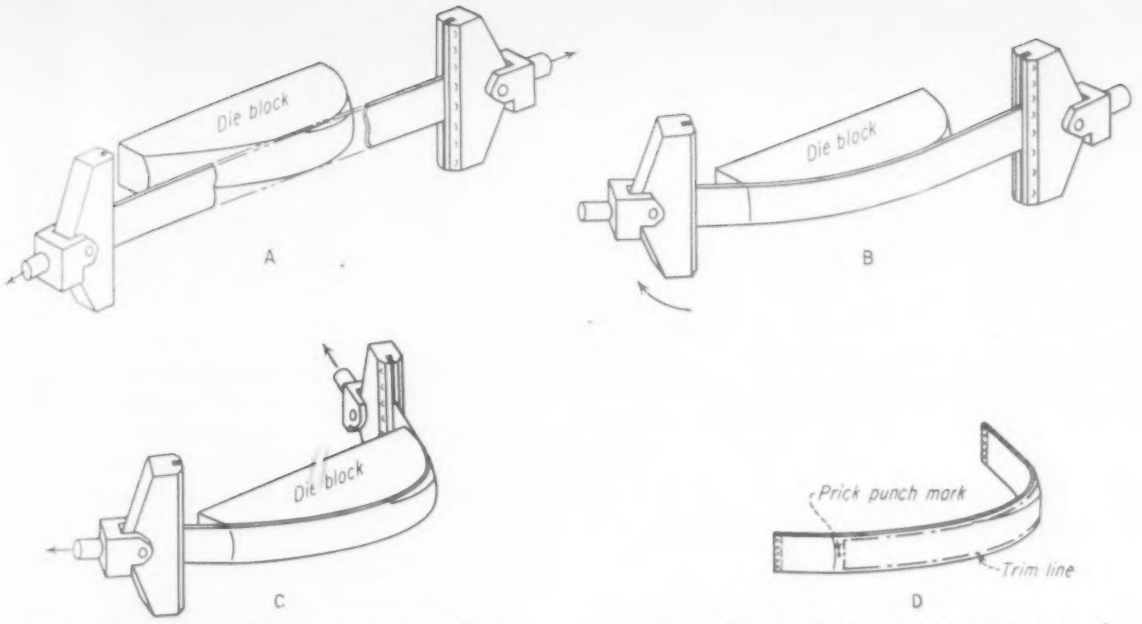

FIG.9—Stretch wrap forming a contoured part with nonsymmetrical curvature. A, initial stretch applied; B, wrap left arm 20° at yield pressure; C, wrap right arm 60° at yield pressure and apply final setting pressure; D, finished formed part before trim. Sheet was 0.081 in. thick.

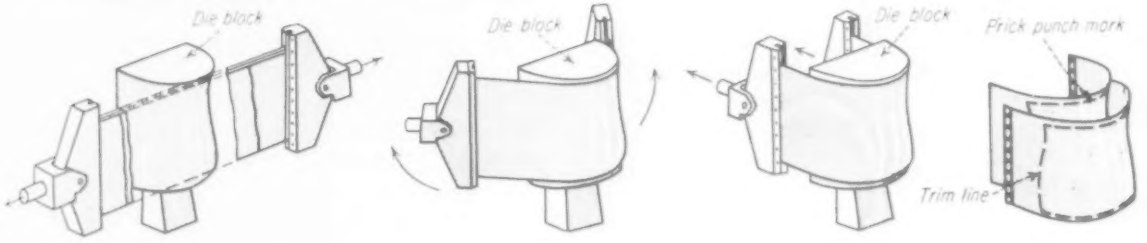

FIG. 10—Two parts with compound and reverse contours and a 180° twist are formed together.

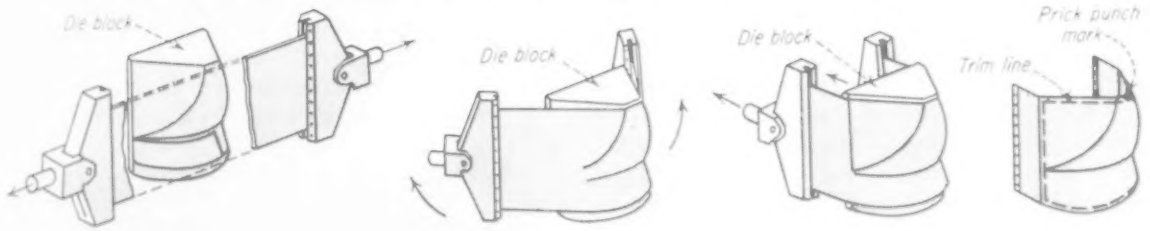

FIG. 11—Saddle-backed shape with 180° curvature tends to buckle in center due to lateral contraction, material slippage in sloped areas of the die. Proper lubricant can help here.

Fig. 11 shows a stretch formed 321 stainless steel part. Blank size is 40 x 54 in. and the stock is 0.031 in. thick. Due to the material used and part design, forming is done on fully annealed stock. In addition, a heavy, deep drawing lubricant is required on the radiused edge of the form die. A 22-ton initial stretch tension is applied, and, after wrap forming is completed, a final setting pressure of 35 tons is used.

The saddle backed shape with 180° curvature, Fig. 11, tends to buckle in the center of the sheet due to lateral contraction and slippage of the material in the sloped areas of the die.

To remedy this condition, apply heavy lubricant to the form die radius adjacent to the jaws only. Use a very light lubricant in the sloped areas of the form die. In forming, control the wrapping movement and accelerate the rate of stretching to lead the wrapping speed.

The practice of forming in pairs to obtain balanced sections and, consequently, a balanced strain distribution, is common.

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[3] "Aluminum Forming," Reynolds Metals Co., 1952, Louisville, Ky.
[4] U. N. Krivobok and G. Sachs, "Forming of Chromium-Nickel Stainless Steels," The International Nickel Co., Inc., New York.
[5] G. Sachs, "Principles and Methods of Sheet Metal Fabrication," 1951, Reinhold Publishing Co., New York.

In rolling mills—

By D. B. Wood
Head, Bearing Section
Cleveland Development Div.
Aluminum Co. of America
Cleveland

ALUMINUM ALLOYS MAKE GOOD BEARINGS

◆ Aluminum alloys have proved a good bearing material for use on rolling mills and rolling mill equipment . . . Developed by Alcoa, two alloys have been tested extensively over a 6-year period on rolling mills built by Morgan Construction Co. of Worcester, Mass.

◆ Solid aluminum bearing bushings performed satisfactorily at much higher operating temperatures than softer materials . . . Heat is rapidly dissipated by the aluminum bearing . . .

◆ AMONG Morgan Construction Co.'s many developments is the "Morgoil" bearing for rolling mills. The company has spent over 25 years on the improvement and perfection of this pressure lubricated sleeve-type bearing.

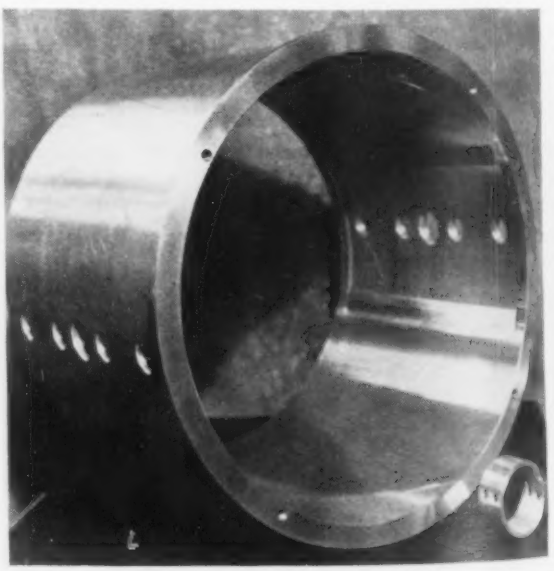
In an effort to improve their products, Morfan engineers felt aluminum bearing alloys might have some advantages as the bushing for a "Morgoil" bearing. Previously a steel-backed bushing with a bearing lining of cadmium-nickel had been used.

In 1946, samples of aluminum bearing alloy material were obtained from the Aluminum Co. of America. A laboratory and field test program was begun and continued through January, 1952. During this time, Morgan made extensive tests under operating conditions in customer's plants to determine the limitation of aluminum bearing materials.

Aluminum bearing materials were found to have exceptional merit for rolling mill applications because they are not subject to attack by organic acids formed in oxidation of lubricating oils during operation of equipment. Laboratory tests indicated that aluminum has no catalytic effect on the oxidation of lubricating oils, whereas certain other metals used in bearings are recognized to accelerate the rate of oxidation. The solid aluminum bearing alloy, in addition, is highly resistant to the corrosive atmosphere found in many plants and will not be affected by additives to the lubricants.

By spotting aluminum bushings in a variety of difficult applications in the field, it was proved that aluminum alloy bushings will stand up under gruelling operating conditions. These bearings were required to support over 5 million lb operating load per bushing. They operated in hot mills and cold mills, 4-high and 2-high, low speed and high speed.

Tests showed elimination of a bonding plane materially increased service life of the bushing and, in the event of failure, did not contribute to damage of adjacent parts. The solid aluminum bearing alloy bushing performed satisfactorily at much higher operating temperatures than softer bearing materials. After analysis of the data, it was decided that aluminum bushings in either alloys XA750-T5 or 750-T5 would give many worthwhile advantages over the previously used steel-backed cadmium-nickel alloy bushings or any now known material.



ALUMINUM alloy bearing material gives better service than steel-backed cadmium nickel bearing formerly used.

MORGOIL bearing casting being poured in Alcoa plant. It required special pouring techniques from 650-lb crucibles.

Improved performance under a variety of operating conditions was achieved with aluminum bearings as compared with steel-backed cadmium nickel bearings formerly used in Morgan rolling mills. Aluminum bushing is available in a wide range of sizes.

Previous test work by Alcoa had shown these aluminum bearing alloys had certain fundamental characteristics which would lend themselves to rolling mill work. These alloys were able to:

1. Carry very high bearing loads.
2. Dissipate and distribute heat rapidly.
3. Operate with the amount of lubrication.
4. Conform to misalignments.
5. Avoid damage to mating parts in the event of failure.
6. Withstand corrosive attack.

Typical mechanical properties of these two aluminum bearing alloys are:

ALLOY	Tensile Strength (psi)	Yield Strength (psi)
XA750-T5	16,000	8,500
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XA750-T5	8	45
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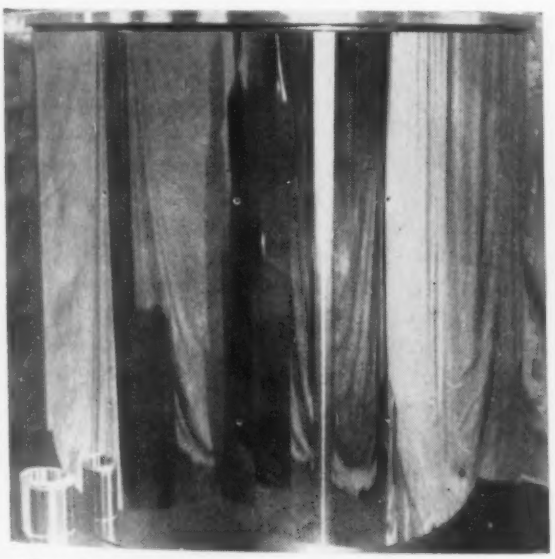
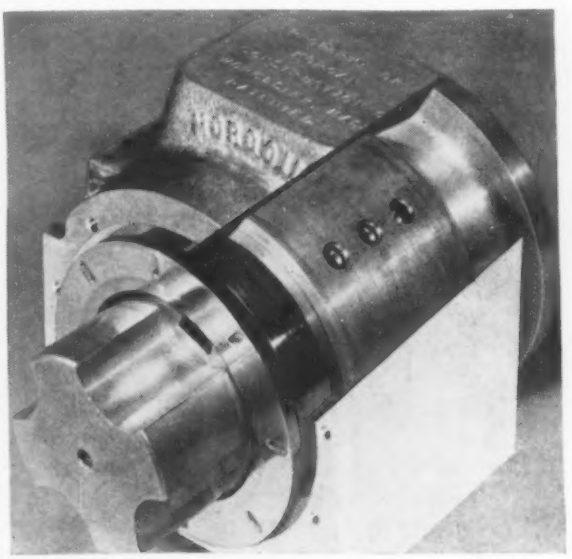


SIZES USED in roll neck bearing assemblies vary widely. Solid aluminum bearing alloy bushings can be used on all types of mills.



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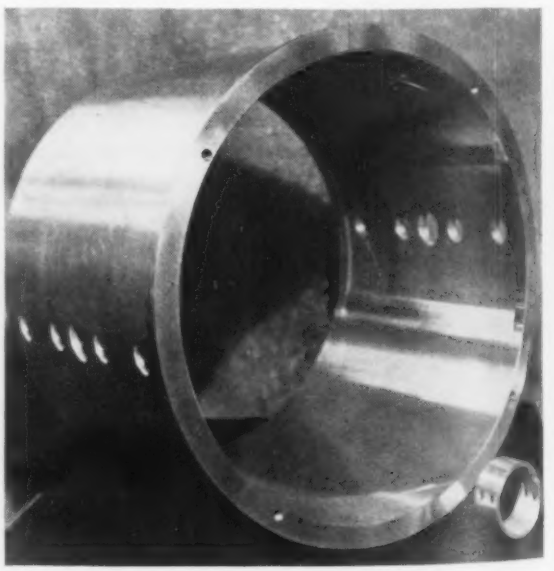

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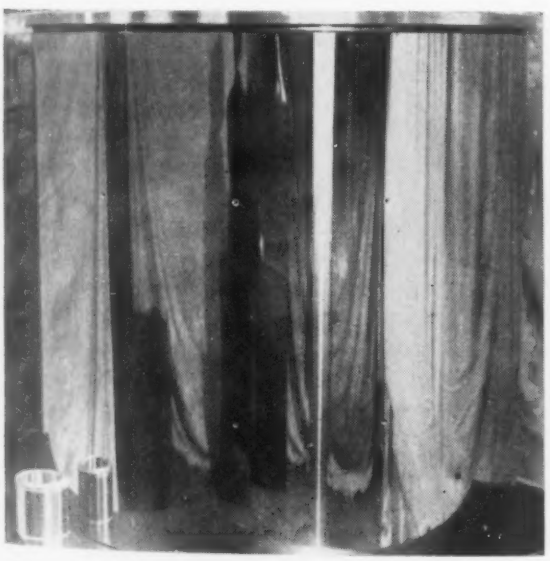

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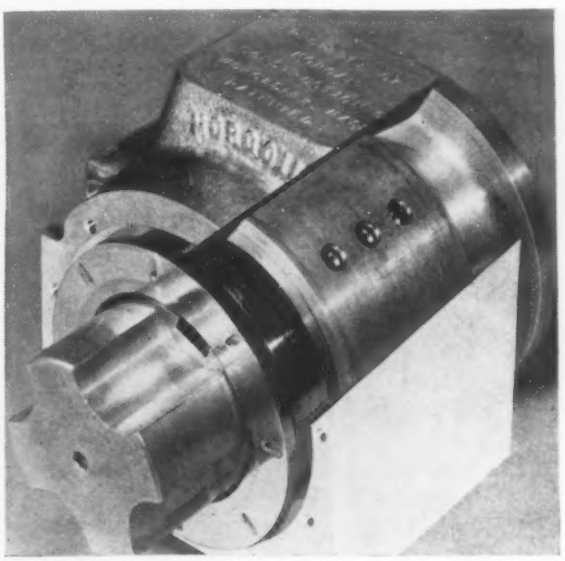

SOLID aluminum bearing plays an important part in this roll neck bearing assembly made by Morgan Construction Co.

DIRECTIONALITY Affects Physical Properties of Wrought Metals

By H. A. Unckel
Metallurgist
Svenska Metallverken
Finspong, Sweden

◆ Physical properties of wrought alloys change with directionality . . . Strength, ductility, impact and fatigue properties are affected in varying degrees, depending on the metal and working process used.

◆ Heterogeneities as inclusions of slag and oxides segregation and intermediate phases are believed to decrease ductility with ensuing stress concentration and crack propagation . . . Another cause is grain alignment by preferred orientation resulting from working—especially excessive cold working.

◆ DIRECTIONALITY in wrought alloys exerts considerable effect on their mechanical properties. Strength, ductility, impact and fatigue properties are influenced by this phenomenon. Although the subject requires further study, the effect of preferred orientation is quite clear.

The degree of directionality varies with the metal and the working process used. One main cause of anisotropy, as it is known, is due to oxide and slag inclusions, segregation, presence of second phase particles of an intermediate compound, or the presence of cracks and cavities.

Another cause is grain alignment in preferred orientation or "texture" resulting from working. This phenomenon occurs especially with excessive cold working. In most cases these two principal types of anisotropy superimpose and cannot be separated with respect to their properties.

Recent studies of mechanical anisotropy of ductile metals[1] revealed a helical fracture in cold worked and annealed specimens prestrained in torsion prior to tensile testing. The conclusion drawn from this was that during cold working development of longitudinal cracks gave rise to directionality.

One proposition[2] deserves mention according to which part of directionality effects may be attributed to elongated granular shapes in worked metal which leads to differences in grain boundary areas in the longitudinal and transverse directions. Cast metals as ingots also show different properties parallel and perpendicular to the columnar crystal zone.

Oxide and slag inclusions in iron and steel develop directionality through forging and hot rolling. The inclusions extend to stringers parallel to the direction of flow resulting in lower ductility and impact value in the transverse direction. Yield and fracture strengths are nearly the same in both directions.

Optimum forging ratio from ingot diameter to product diameter is reported to be about 3:1.[3] Lower reductions do not break down the cast structure satisfactorily and convert it to a wrought one. Larger reductions definitely decrease the transverse properties with no appreciable further gain in longitudinal properties.

Stringers of hard, angular particles are most harmful, with the impact value decreasing as much as 40 pct depending on the specimen angle. A correlation has been found[4] between inclusion content and ductility, measured in area contraction, with Cr-Ni-Mo steel.[4] Retempering or requenching has no appreciable effect on transverse contraction of area value.[5] Table I[6] gives some idea as to what degree forging affects the properties of 0.36 pct carbon steel.

Heterogeneities, elongated to stringers, affect fatigue properties to a remarkable degree. Fatigue strength in the transverse direction depends on the degree of forging. It was about 15 pct less than in the longitudinal direction.[7] Kind and size of nonmetallic inclusions exert considerable influence.

With extruded rods and shapes, directionality may result from second phase particles in the

TABLE I

EFFECT OF FORGING DEGREE

on 0.36 Pct Carbon Steel

Proportion Ingot Diam. to Forged Rod Diam.	Yield Strength, psi	Tensile Strength, psi	Elongation, pct	Area Contraction, pct	Charpy Impact Value, ft-lb
	Longitudinal Specimens				
1	42,500	81,400	19.0	27	41
2	45,500	81,400	23.0	42	58
4	45,500	81,400	25.0	52	70
8	47,000	81,000	26.0	57	75
12	49,800	81,000	27.0	57	75
	Transverse Specimens				
1	42,500	81,000	18.0	27	41
2	47,000	81,000	20.5	28	46
4	47,000	81,000	20.5	28	41
8	48,300	81,000	17.0	25	29
12	48,300	81,000	12.5	18	17

structure arranged in the direction of flow, and also from preferred crystallographic orientation of the grains. Extruded rods of cubic face centered metals have a texture with the cube diagonal [111] parallel to the direction of flow intermixed with [100]-directions of a more faint indication.[8] The cubic face centered crystal has its highest yield and tensile strengths in the [111] direction which partially explains the higher values (15 to 20 pct) of longitudinal speciments compared with transverse.

Extruded and heat treated rod of age-hardening aluminum alloys have higher yield and tensile strengths than when the rod is cold drawn after extruding before heat treating. This extrusion or "press" effect is probably caused by preferred orientation although recrystallization and grain growth phenomena may play a part.

Both the orientation effect and the presence of intermetallic brittle phases tend to lower transverse ductility. The position of the "fiber" is especially important in die forged parts of the type used in aircraft construction.[9]

Some values of mechanical properties of extruded and heat-treated aluminum rod had been reported previously. Further experiments with commercial purity aluminum showed yield and tensile strengths about 10 pct lower. Ductility in the transverse direction was lower than in the longitudinal direction. About the same values were obtained after annealing the extruded rod. An aluminum alloy containing 2.3 pct Cu, 0.4 pct Mg and 0.3 pct Mn showed pronounced directionality by extrusion.

With the 76-pct copper alloy, directionality in the extruded condition is slight, but in the drawn, and drawn and annealed state, the strength is notably higher in the lngitudinal direction. Ductility is about the same in both directions.

The alpha-beta special brass alloy shows little difference in yield and tensile strengths with direction, but in the Charpy impact test the transverse specimen is inferior. The same applies to the beryllium-copper alloy which had lower ductility in the transverse direction. The aluminum bronze containing iron and nickel shows some directionality in yield and tensile strengths.

Hexagonal magnesium and zinc alloys exhibit distinct directional properties. In extruded and drawn rod, the hexagonal crystallographic plane lies almost parallel to the rod axis. Higher strength in that direction results in the magnesium alloy rod. The same applies to the extruded zinc alloy. With this alloy, twin formation leads to more equiaxed properties. Charpy values with these alloys are so low it is difficult to draw definite conclusions.

Data on fatigue properties of extruded material is meager. On the influence of specimen direction, a 15 to 20-pct lower fatigue strength has been found in the 45° direction than in the longitudinal direction.[10] Other studies[11] have shown that both static and fatigue strengths are nearly equal in both directions. Fatigue tests[8] with longitudinal and transverse specimens of 24S alloy showed considerable scatter and further testing is necessary for definite conclusions.

The degree of deformation from ingot to extruded section also influences properties. If the extruded section is large in proportion to the ingot section, the degree of working may not be sufficient to completely transform the cast structure to a wrought one. This applies

TABLE II

PROPERTIES OF 51S ALUMINUM

(Heat Treated and Aged)

Condition	Yield Strength, psi	Tensile Strength, psi	Elong., pct	Area Contraction, pct
As-Cast	35,900	41,950	4	5
Forged 10 pct reduction	39,550	46,400	5	7
Forged 30 pct reduction	41,900	48,700	6	9
Forged 80 pct reduction	43,900	47,500	10	46

TABLE III

RELATIVE TENSILE AND ELONGATION

values

Material and Texture	Tensile Strength, Angle to Rolling Direction			Elongation, Angle to Rolling Direction		
	0°	45°	90°	0°	45°	90°
Aluminum (100) [001]	1	1.13	1.03	1	1.97	1.21
Copper (100) [001]	1	1.08	0.99	1	3.40	1.15
Calculated	1	1.06	1.00	1	2.30	1.0
Silver (110) [112]	1	0.92	0.90	1	1.00	0.96
Alpha brass (100) [112]	1	0.95	0.94	1	1.09	1.12
Calculated	1	0.92	0.89	1	1.10	11.2

[9] See "Grain Size Key to Mechanical Properties," The Iron Age, Dec. 18, 1952, p. 148.

Transverse specimens will give lower values when they are very highly reduced.

especially to the first end of the rod leaving the die.

With a 5½-in. bar extruded from a 24S alloy billet 10 in. in diam, the longitudinal specimens from the fore end, in the fully heat-treated and aged condition, had yield strength of 44,100 psi, tensile strength of 54,700 psi, elongation of 3 pct, and contraction of area of 3 pct. Corresponding values from the rear end of the rod were 51,300 psi, 72,600 psi, 13 pct and 12 pct respectively. A transverse specimen from the center of the rod had a yield of 42,300 psi, tensile strength 51,200 psi, elongation of 2 pct, and area contraction of 1 pct.

To further study the influence of hot working degree on properties, a billet of cast continuous 51S alloy was forged at 450°C with various reductions. Longitudinal properties, after heat treating and aging, are given in Table II. Although strength may be developed after relatively small reductions, ductility is considerably improved with higher reductions. Transverse specimens will give lower values at very high reductions.

Directionality in cold-rolled and cold-rolled and annealed sheet caused by preferred crystal orientation is best known through its unwelcome effect of ear formation in deep drawing. In sheet annealed after cold rolling of face centered cubic metals, two different textures have been observed. With some metals, after heavy reductions and annealing at high temperatures, the crystallographic cube plane lies in the rolling plane with the cube edges parallel and perpendicular to the rolling direction.

Values set equal to unity

The texture generally found with cubic face centered metals is achieved by alignment of the diagonal plane [110] parallel to the rolling plane with the [112]-direction in the rolling direction. Values of tensile strength and elongation in different directions, as compared to the values calculated on the basis of the directional properties of single crystals, are given in Table III.[12] Relative values, those in the rolling direction, are set equal to unity with the sheet annealed after cold rolling.

In other experiments with aluminum, yield and tensile strengths increase continuously with the specimen angle to the rolling direction in cold-rolled sheet. At 90 pct reduction, yield strength is 22,000 psi and tensile strength 23,700 psi parallel to the rolling direction, and 22,900 psi and 23,400 psi respectively in the transverse direction. Elongation is independent of the specimen direction and area contraction

TABLE IV

EFFECTS OF DIRECTIONALITY ON TUBULAR MATERIALS

Material, Dimensions and Fabricating Method	Direction	Yield Strength, psi	Tensile Strength, psi	Elong., pct	Red. of Area, pct
Aluminum, extruded to 2.44-in. OD, 0.195-in. wall thickness and cold reduced to 1.54-in. OD, 0.118-in. wall thickness.	Long. Trans.	17,100 17,200	19,900 18,800	7 8	84 86
Aluminum, cold reduced to 1.77-in. OD, 0.057-in. wall thickness and annealed.	Long. Trans.	5,970 7,120	11,550 11,800	32 30	91 93
24S aluminum alloy, extruded to 4.80-in. OD, 0.275-in. wall thickness, drawn to 4.2-in. OD, 0.072-in. wall thickness with two anneals, then heat treated and aged.	Long. Trans.	48,000 44,300	70,500 67,500	15 13	23 24
24S aluminum alloy, same as above, then strip reheat treated after straightening.	Long. Trans.	42,500 40,000	68,600 65,900	17 15	24 23
24S aluminum alloy, extruded to 2.43-in. OD, 0.198-in. wall thickness, cold reduced to 1.18-in. OD, 0.039-in. wall thickness, one intermediate anneal, then annealed.	Long. Trans.	11,700 14,500	26,600 23,600	20 21	54 50
51S aluminum alloy, extruded to 2.45-in. OD, 0.197-in. wall thickness, drawn to 1.96-in. OD, 0.079-in. wall thickness, intermediate annealed, heat treated and aged.	Long. Trans.	30,250 32,100	43,800 42,900	23 20	43 38
51S aluminum alloy, extruded to 2.45-in. OD, 0.197-in. wall thickness, drawn to 1.96-in. OD, 0.032-in. wall thickness, one intermediate anneal, then annealed.	Long. Trans.	8,150 9,100	20,600 18,800	28 21	66 63
51S aluminum alloy, same as above, then reannealed after straightening.	Long. Trans.	7,700 8,250	21,800 21,900	21 21	76 74
Copper, hot rolled on piercing mill to 7-in. OD, 0.36-in. wall thickness.	Long. Trans.	6,980 15,300	30,400 30,000	39 38	81 32
Copper, same as above, then strip reannealed after straightening.	Long. Trans.	4,120 4,120	20,900 20,600	47 47	82 82
Copper, hot pierced to 3.08-in. OD, 0.38-in. wall thickness, drawn to 1.55-in. OD, 0.12-in. wall thickness.	Long. Trans.	60,300 40,200	62,300 54,000	5 5	44 31
Copper, same as above, then strip annealed after straightening.	Long. Trans.	8,390 9,300	35,200 33,100	41 34	67 57
Brass with 76 pct Cu, extruded to 2.40-in. OD, 0.22-in. wall thickness, annealed after straightenting.	Long. Trans.	10,950 10,400	44,900 40,600	64 59	95 73
Brass, same as above, but drawn to 1.38-in. OD, 0.04-in. wall thickness.	Long. Trans.	34,400 44,500	64,900 56,400	37 24	67 64
Brass, same as above, annealed after straightening.	Long. Trans.	10,400 11,300	44,200 43,300	62 61	78 74
Brass, 60.5 pct Cu, 1 pct Pb, 38.5 Zn, extruded to 1.19-in. OD, 0.078-in. wall thickness, three intermediate anneals.	Long. Trans.	....	73,700 73,700	8 7	29 34
Brass, same as above, annealed after straightening.	Long. Trans.	....	62,800 59,200	46 45	58 56
Aluminum-brass, 76 pct Cu, 2 pct Al, 22 pct Zn, extruded to 2.42-in. OD, 0.196-in. wall thickness, cold reduced to 1.02-in. OD, 0.118-in. wall thickness, one intermediate anneal, then annealed after straightening.	Long. Trans.	24,300 20,700	62,200 52,200	43 42	61 58
Nickel silver, 12 pct Ni, 64 pct Cu, extruded to 3.08-in. OD, 0.23-in. wall thickness, drawn to 1.00-in. OD, 0.19-in. wall thickness, one intermediate anneal,	Long. Trans.	87,700 75,600	88,200 78,000	5 4	53 54
Nickel silver, same as above, annealed after straightening.	Long. Trans.	27,650 23,700	62,500 51,200	38 36	70 69
Tin bronze, 90 pct Cu, 9 pct Sn, 1 pct Zn, extruded to 2.60-in. OD, 0.28-in. wall thickness, drawn to 1.30-in. OD, 0.158-in. wall thickness.	Long. Trans.	63,700 73,400	82,000 80,100	33 8	64 33
Tin bronze, same as above, annealed after straightening.	Long. Trans.	23,100 20,400	58,600 52,500	66 53	74 66
Brass, 70 pct Cu, 1 pct Sn, 29 pct Zn, extruded to 2.45-in. OD, 0.196-in. wall thickness, cold reduced to 0.90-in. OD, 0.078-in. wall thickness.	Long. Trans.	....	85,000 83,000	7 6	52 43
Brass, same as above, annealed after straightening.	Long. Trans.	....	47,200 45,100	72 72	70 69

is slightly higher at 45°. In the annealed condition, values in the longitudinal direction were practically the same as in the transverse direction.

With copper, too, yield and tensile strengths increase with the specimen angle. After 90 pct reduction, yield strength was 54,200 psi and tensile strength 57,600 psi parallel to the direction of rolling, and 57,500 psi and 64,500 psi respectively at right angles to the rolling direction. Elongation falls with increasing specimen angle whereas area contraction shows a pronounced maximum under 45°. In the annealed condition, no appreciable differences were observed. Annealing at high temperatures leads to the (100) [001]-texture which gives an elongation about three times as great as in the ordinary (110) [112]-texture.

Tensile strength rises with angle

Cartridge brass, with 72 pct Cu, gave no difference regarding direction after cold rolling with 20 pct reduction. In the annealed condition, yield and tensile strengths were slightly higher in transverse specimens. With 90 pct reduction, tensile strength increases from 104,500 psi to 121,000 psi with increasing specimen angle.

Alpha-beta brass with 59 pct Cu, 2 pct Pb and 38 pct Zn, showed lower yield and tensile strengths in the transverse than in the longitudinal direction. This is probably due to the stretching out of the lead particles in the rolling direction which increases their sectional area in the transverse direction relative to the longitudinal direction.

Tin bronze, with 5 pct Sn had considerably higher strength perpendicular than parallel to the rolling direction—151,000 psi and 122,000 psi respectively. These values were confirmed by a later investigation.[13]

Directionality bending tests

With the 24S aluminum alloy in the heat-treated and fully-aged condition, the highest strength values were parallel to the rolling direction indicating an influence of strokes of intermediate phases. In the annealed condition, properties were nearly equiaxed. Experiments with different grain size conducted with various alloys gave the same trend in the values.

Directionality in sheet material is also revealed by bending tests. Cracking in fabricating processes occurs much more easily if the bending line runs parallel to the rolling direction[14] and applies especially to the cold-rolled condition. This effect occurs even with pure metals and homogeneous alloys so that it may be caused by the alignment of grain boundaries parallel to the rolling direction.

Bending experiments were carried out around a radius equal to the sheet thickness over 180°. One bend was made through 90° back and forth. With aluminum in the cold-rolled state, the bending number in the transverse direction was 25 pct lower than in the rolling direction. In the annealed state, it was 7 pct lower. With cold-rolled copper reduced 90 pct, the bending number of transverse specimens was only half that of longitudinal specimens. Cartridge brass, after the same reduction, was as much as 85 pct lower in transverse specimens. The same ratio applied to tin bronze.

Annealed sheet of cartridge brass which had not shown directionality in strength or ductility values gave 20 pct lower bending number in the transverse direction. Lead bearing alpha-beta brass had a 30 pct lower bending number in the transverse specimens after cold rolling and about 20 pct lower in the annealed state.

Experiments on pressurized tubes of various nonferrous metals and of different dimensions showed that stress is highest in the longitudinal sectional area. Therefore, strength of the transverse tangential specimens was more significant than that of the longitudinal. Typical results are given in Table IV.

As with drawn rods, texture, in metals of the cubic face centered type, is with the [111] crystallographic axis in the direction of the tube axis. This also applies to the annealed state. For tensile testing, transverse specimens had to be straightened which involved plastic cold deformation and altered the properties, especially yield strength.

ACKNOWLEDGEMENT

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Longer half life—

CESIUM RADIO ISOTOPE ... New Tool For Parts Inspection

By J. M. Thompson, Chief Metallurgist
P. A. Glenn, Metallurgist
Consolidated Vultee Aircraft Corp.
Fort Worth Div.
Fort Worth, Tex.

◆ Cesium 137 is being used to inspect for part defects and misalignment . . . A 33-year half life promises to give it wider use as an inspection tool for companies doing a limited amount of work.

◆ It has an intermediate energy level and bridges the gap between iridium 192 and cobalt 60 . . . Cesium 137 is very suitable for use with materials of intermediate thickness and density . . . Since it is a fission product it should be more readily available in the future.

◆ CESIUM 137 may well prove to be a valuable source for industrial radiography in the near future. It is now being used by Consolidated Vultee Aircraft's Fort Worth Division as an nispection tool for locating part misalignment and examining assemblies, damaged parts and electrical connections in inaccessible areas of airframes for B-36 aircraft. This radioactive isotope has an energy level of 0.067 million electron volts. It bridges the gap between the energy levels of the two widely used gamma ray sources, iridium 192 and cobalt 60. It can therefore be used for X-raying materials of intermediate thickness and density.

Cesium 137 was selected by Convair's Process Control Dept. for investigation because of its intermediate energy level and comparatively long half life of 33 years. The isotope is a pure beta ray emitter, but the source acquires its gamma ray emission from barium 137 which has a half life of only 2.6 min. Cesium 137 has the advantage over iridium 192 and cobalt 60 in that it is a fission product and not irradiated material. It should therefore be more readily available since it is a by-product of the reactor. Because of the long half life and the possibility of its becoming more available, cesium 137 promises to be a very practical source for companies which do only a limited amount of radiographic work.

The 500 millicurie source used at Consolidated Vultee Aircraft Corp. is in the form of cesium sulfate and is less than 1 mm in size. The source is encapsulated in a standard source holder, the dimensions being approximately ½ in. in diam and ⅜ in. in height. The source unit has a 410 stainless steel top which allows the use of a magnetic handler, see Fig. 1. Since a large portion of the parts to be inspected are assembled on the airframe, it is necessary

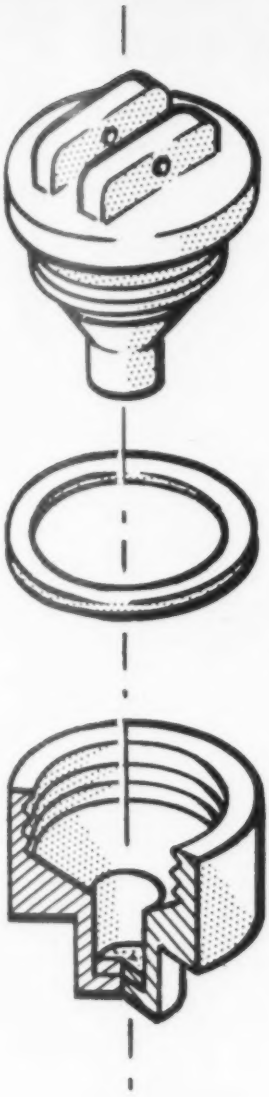


FIG. 1 — Capsule for holding Cesium 137 has a 410 stainless steel top which allows the use of a magnetic handler.

to store the source in a portable container. The container which is made of aluminum and lead, was designed for portability, accessability, protection of personnel and security, see Fig. 2.

After obtaining the cesium 137 source from the Oak Ridge National Laboratory, exposure curves and techniques had to be established since there was no available data on the use of this isotope. Exposure curves developed for steel, magnesium and aluminum by making exposures through step-block penetrameters of the material are shown in the curves on the following page. The correct exposure was determined by using a densitometer. As the majority of operations take place under circumstances where one fixed distance is not possible, exposure curves were determined for variable distances. These curves represent a few of the established distances and are fixed.

Safety measures important

In establishing these exposure curves, various types of film were used. Eastman Kodak type A and K, or equivalent, proved very satisfactory; type K film being used where major defects can be expected, type A being used for locating defects of a relatively small nature. In experimentation, various screens were employed. Best results were obtained using 0.005-in. gage lead in front of the film and 0.010-in. gage lead in back of the film. This was especially critical for steel.

One of the major problems common to isotypes is the long exposure time required to produce a radiograph. Because type K film has the highest available speed for gamma ray work, when used directly or with lead foil screens, it was used to reduce exposure time when radiographing thick sections and large assemblies. Type A film was substituted for type K film when radiographing thin gage materials and small assemblies because of its fine grain and high contrast characteristics. To increase the film density resulting from a decrease in exposure, is was necessary to increase the developing time from 5 min, which is the normal time for X-ray work, to 10 min. Exposure curves shown on page 176 based on a 10-min developing time at 68°F.

Further experimentation showed that the direction of radiation by using a lead cone, see Fig. 3, was found to reduce the exposure time but decreased the sensitivity. In the examination of small assemblies, the nondirected radiation method gave the best overall radiographs. To minimize radiation back-scatter, the source should be supported by a nonmetallic, low density material.

As with all radioactive istopes, rigid safety precautions are necessary. At Convair the

FIG. 2—Portable container made of aluminum and lead is braced inside a carrying case fastened by strong chain and lock.

Isotopes are low cost, easily portable and produce no maintenance problems.

source must be handled by a 6-ft magnetic handle. Personnel are required to carry pocket dosimeters which are checked daily and the exposure recorded. They are also required to wear film badges which are checked weekly. The source in its locked container is stored in a locked and restricted area.

Isotopes as radiographic sources have several advantages and disadvantages as compared with X-ray equipment. They are of relatively low cost. produce no maintenance problems, are easily portable and their small size makes them adaptable to any close place. Isotopes have a very wide latitude. Due to the wide beam, multiple exposures are possible. No adjustment of machine settings is required. Disadvantages include lack of control over the energy level and the necessity for longer exposures.

Compared with other isotopes currently being employed in industrial radiography, cesium 137 has these additional advantages: A long half life makes replacement unnecessary; it covers the intermediate energy level; frequent recalibration for exposure curves is unnecessary; it is a fission product which should make it more readily available and cheaper; size of the source may be changed because the material is in form of a salt. One disadvantage is its large focal point because it is in salt form.

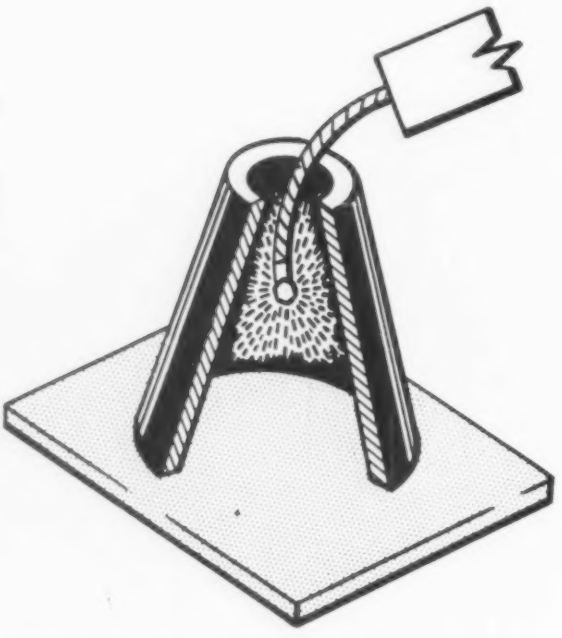
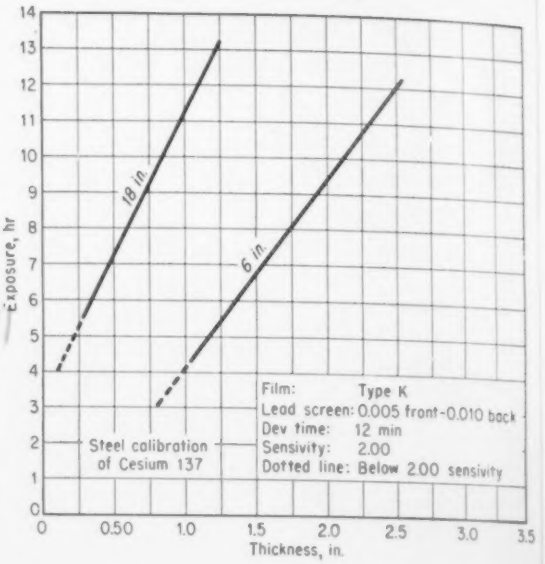
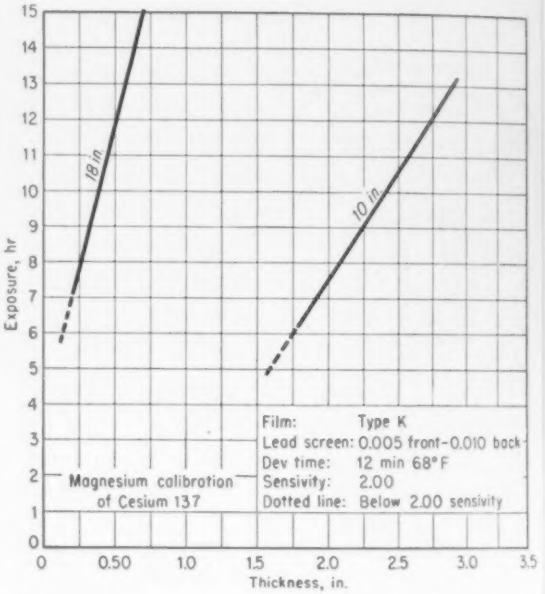
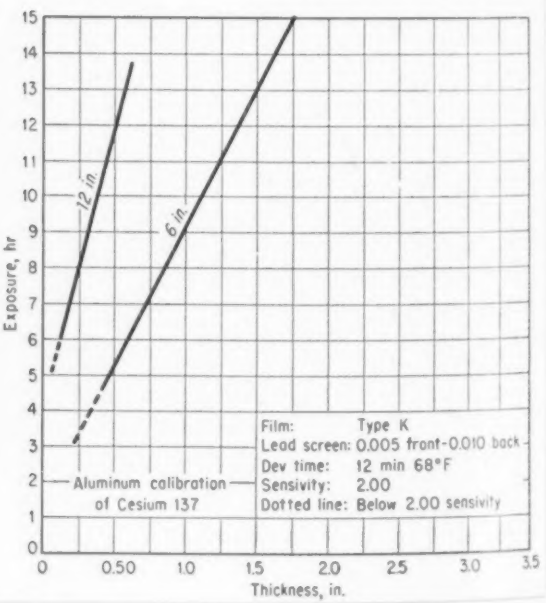


FIG. 3—Lead cone for directing gamma rays cut exposure time, raised sensitivity.

EXPOSURE CURVES

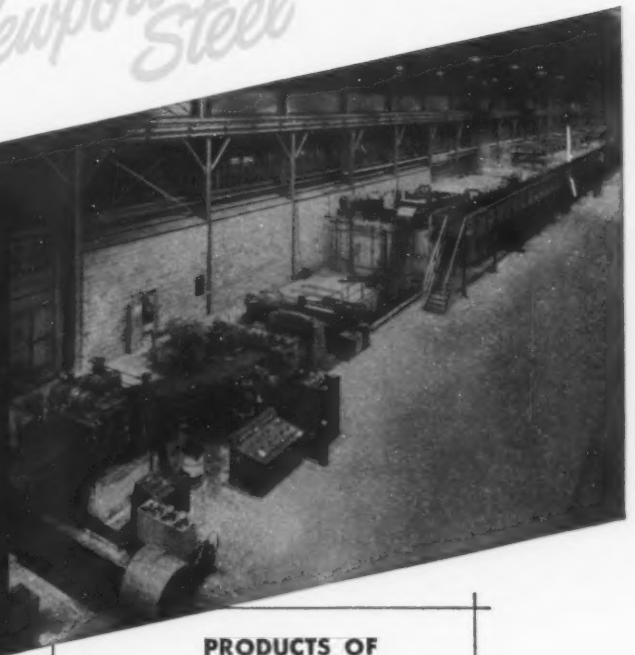






CONTINUOUS PICKLING UNIT

added at *Newport Steel*



The first new facility completed this year in Newport's program of progress is a $3,000,000 continuous pickling line. Customers now may secure still another high-quality end-product in the form of hot-rolled pickled steel in coil from Newport's unique reversing hot mill, which started rolling in 1949. Other additions include electric furnaces, another soaking pit, electric weld pipe mill, and river barge loading facilities. These modern improvements plus 68 years of steelmaking experience make Newport an increasingly dependable source for your volume requirements.

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Technical Briefs

STATIC TESTING:

Unusual testing fixture will try Navy flying boat parts.

Better testing of structural features of big Navy flying boats is possible with the new static test facilities developed at Convair's San Diego, Calif., plant. The huge steel dock is the largest fixture of its kind in the aircraft industry.

The test chamber is built on a 3-ft concrete foundation, 100 x 196 ft. Approximately 2200 cubic yards of concrete and 60 tons of structural steel were required in the foundation. The heavy slab is designed with tracks which can resist a load of 15,000 lb per foot.

Enclosed With Plastiglass

Steel columns support large steel trusses which are used to apply loads to seaplane wings, hulls, and various components. Maximum height of the structure is 67 ft, with ceiling heights of 56 ft in one bay and 35 ft in another.

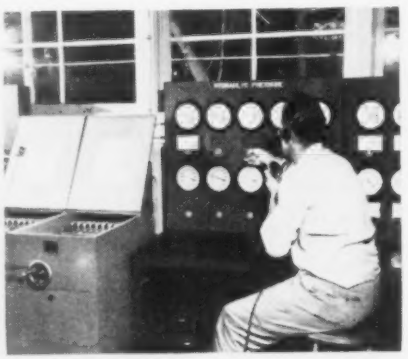
The structure is enclosed with plastiglass siding for weather protection. Test recording equipment is installed in a separate building 20 x 40 ft, which also has office space for engineering personnel.

Components placed on the huge fixture will be destroyed during tests in order to ascertain ultimate strength characteristics. This destruction is necessary to prove the structure and safety of new planes.

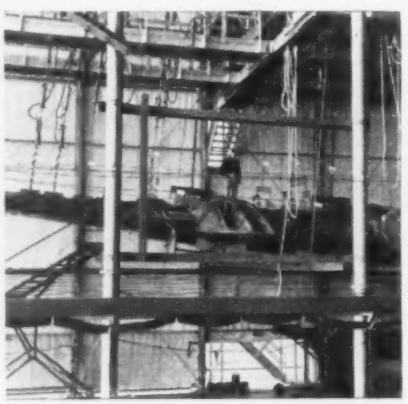
Replaces Flight Testing

Thirty years ago structural testing was largely accomplished by subjecting an airplane in flight to various unusual loads. This procedure was not only hazardous, but the information obtained was often very meager. Another method of structural testing several years ago was the use of sand bags which were piled on the wings.

In the new test facility, various types of loads can be applied by hy-



HYDRAULIC PRESSURE applied to structures tested in Convair's new static test facility are regulated in this control room.



WING UNDER test load. Catwalks give access to apparatus. Below are hydraulic lines and hundreds of wires connected to strain gages.

SIDING on steel framework of Convair's new $369,000 test facility is plastiglass. The setup will permit static testing of airplane components such as wings, fuselage.

IF YOU WANT MORE DATA

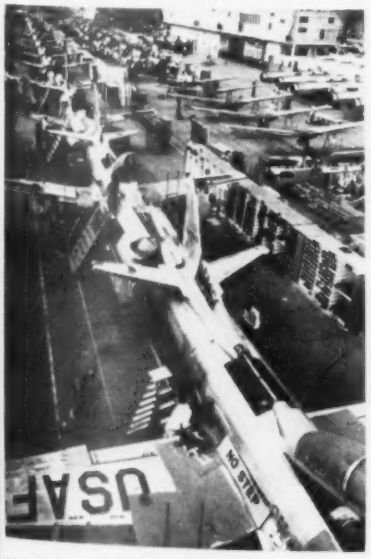
You may secure additional information on any item briefed in this section by using the reply card on page 133. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

draulic jacks on an airplane. The equipment can simulate many flight conditions such as rolling-pullout, positive low angle of attack, symmetrical hull landing, and dynamic landing. Equipment can apply loads ranging from 60,000 to 1,000,000 lb from any direction, and can divide any one load into as many as 200 application points.

Use Strain Gages

On the R3Y wing recently tested, 3000 sponge rubber pads, 5 x 5 in., were glued to the wing surface. These pads, plus a "whiffletree" ar-

HERE'S HOW hydraulic loading jacks are attached through whiffletrees and tension pads to a wing surface.



STARFIRE F-94C jet interceptors, shown on assembly line at Burbank, Calif. plant of Lockheed Aircraft Corp., are radar equipped, do better than 600 mph.

Turn Page

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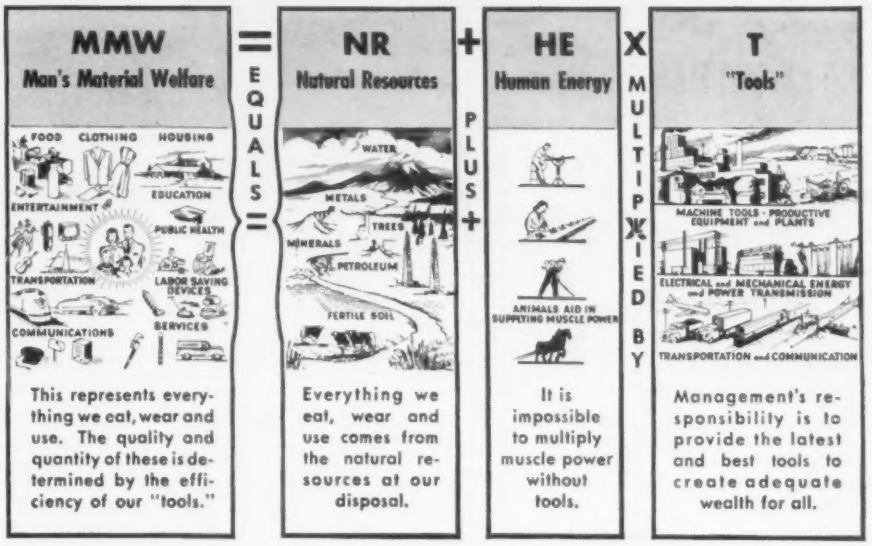


Do Tools Perform Better for The State?

State ownership produces no new productivity

The chart above, depicting economics in its simplest terms, shows that man's material welfare is the product of three things only:

- Natural resources.
- Human energy.
- Tools.

The level of material welfare of any society can be measured by the quality and quantity of each of the above three factors.

Therefore, any scheme to improve man's material welfare must deal with these three factors and can be analyzed in terms of them. But, too often, proposed changes in economic systems are not analyzed in these terms at all.

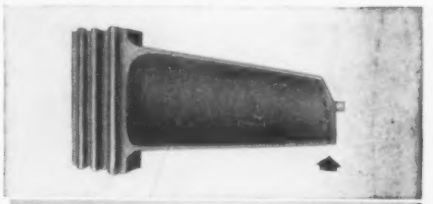
For example, the British people accepted the proposal of the British Socialists to better their welfare. This involved transfer of ownership and management of certain tools of production to the State. When they got all through, there had been no addition to the country's resources, human energy or tools. But, there had been a loss. Productivity suffered when the profit incentive was eliminated by State ownership.

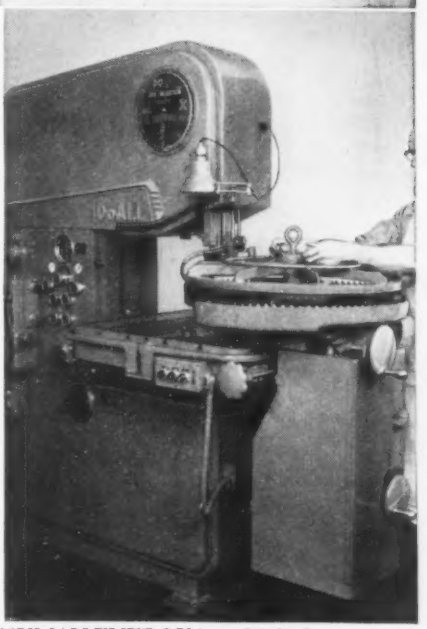
What is true in England is true anywhere in the world, including the United States.

The United States, utilizing a competitive, economic system has had the incentive to create and put to use more tools per capita than any other nation in the world. As a result, America has the highest standard of living in the world.

•

Typical of American-developed tools that multiply man's productivity is the band machine. Originated and pioneered by The DoALL Company, these machines slice through any material, cutting continuously. No other machine tool can remove sections of material so fast. In the metalworking industry they are widely used to shape metal, replacing other tools which remove large sections slowly, a chip at a time. Time savings run as high as 200-300%. DoALL machines are sold through a nation-wide network of DoALL Stores. Headquarters are The DoALL Company, Des Plaines, Illinois.





HUMAN ENERGY is multiplied many times by this DoALL band machine shown cutting jet engine parts.

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First, the high-strength, pressure-dense castings produced by Shenango's centrifugal process... castings free from sand inclusions, blowholes and other defects ... are keeping work stoppage, lost production and premature part failure to a minimum for Shenango users everywhere.

Secondly, modern facilities and skilled workmen at Shenango turn out precision-machined parts *exactly* to your specifications. A real saving in time and money over parts that *almost* fit perfectly.

Send for free bulletins. All sizes and types of symmetrical parts are produced by Shenango in rough, semi- or precision-machined finish. Bulletin No.150 covers nonferrous metals; Bulletin No. 151 covers Meehanite Metal, Ni-Resist and special iron alloys. *Write to...*

SHENANGO-PENN MOLD COMPANY
Centrifugal Castings Division
Dover, Ohio
Executive Offices: Pittsburgh, Pa.

SHENANGO

ALL RED BRONZES • MANGANESE BRONZES • ALUMINUM BRONZES
MONEL METAL • NI-RESIST • MEEHANITE® METAL

rangement which distributes the load applied by hydraulic ram, make it possible to duplicate accurately every flying or landing condition load that an airplane is likely to encounter.

For some tests, tiny wires, called "strain gages," are glued to the airplane structure. These gages, which measure how much the material is stretching, are so sensitive that it is possible to measure the stretch of a few millionths of an inch. An electronic unit automatically plots data furnished by the gages. Engineers can easily determine what the stresses are and can predict how much load can be applied before a part fails.

Wing-tip deflections of more than 10 ft are reached in testing wings of large airplanes. In the near future, an R3Y pressurized hull will be tested in the fixture. While simulating flight at 30,000 ft altitude, the hull will be bent, twisted, and subjected to 11 different loading tests.

POWER:

Big new wind tunnel to have an 83,000 hp electric motor.

Installation of one of the most powerful electric motors ever built —83,000-hp—completes the first major step in assembly of the 216,000-hp electric drive for the U. S. Air Force's new transonic and supersonic wind tunnels.

Completion of the two wind tunnels will permit the testing of full-size jet engines, guided missiles, and wing sections and fuselages of aircraft at speeds up to 2500 miles per hour.

Stands 21½ ft High

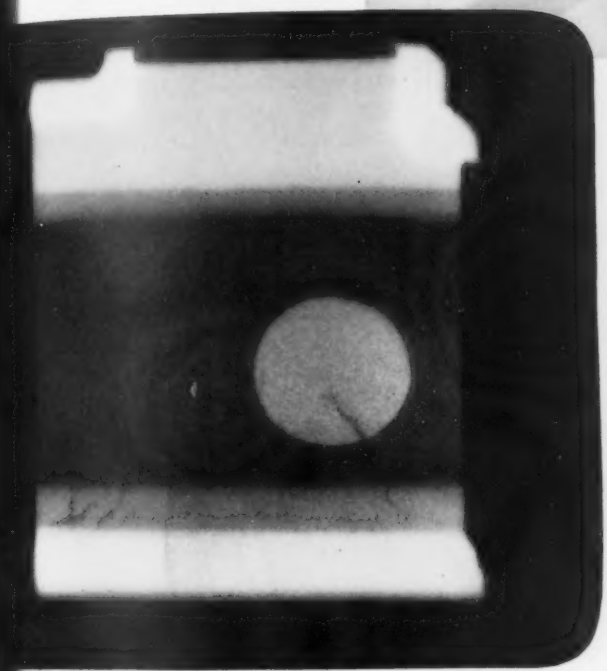
The motor was installed at the Arnold Engineering Development Center, Tullahoma, Tenn. The Center houses important aeronautical research facilities, available not only to the Air Force, Army and Navy, but also to all parties—in government, industry, and science—interested in aircraft development.

The giant synchronous motor is one of two such units built

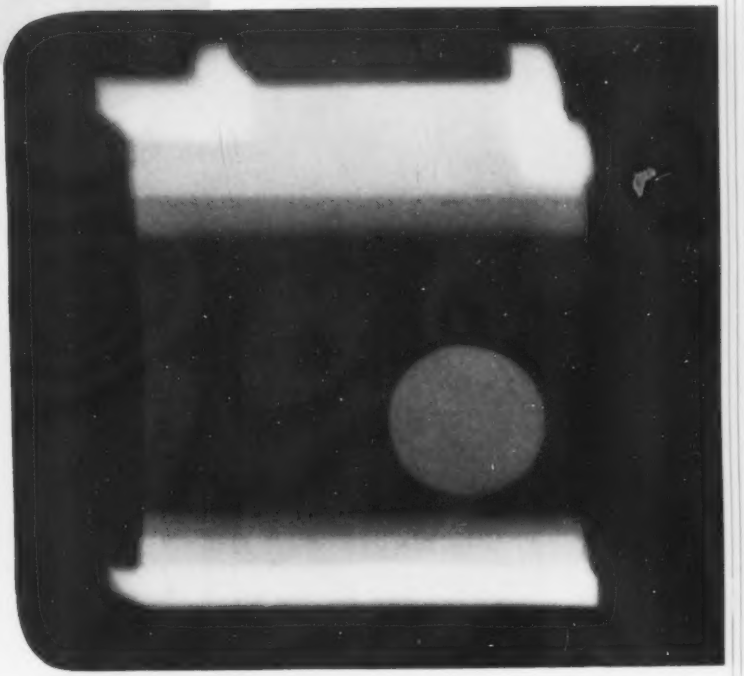
Turn Page

When shrink occurs...

Yield shrinks, too...



Radiograph shows recurring defects due to shrinkage.



A change in gating produced sound castings.

Radiography helps avoid shrink

Shrink can pose a real problem in casting 355 aluminum. It did with this instrument housing.

But radiographs of the pilot runs showed a recurring pattern of defects. This suggested a change in gating which quickly corrected the difficulty.

This is a typical reason why more and more foundries are making full use of radiography. It proves the soundness of their work—helps build a reputation for prompt delivery of good castings.

If you'd like details on how Radiography can improve your operations, get in touch with your x-ray dealer. Or, write us for a free copy of "Radiography as a Foundry Tool."

EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y.

Radiography...

another important function of photography

Kodak
TRADE-MARK

Sometimes

"Who Says So?"

is Mighty Important!

PLANNING and engineering fire protection —especially for those key hazards where fire can hit like lightning and with crippling effect—is a job for experienced specialists only. Knowing "who says so" and his qualifications may save you from huge loss.

Fire protection by low pressure carbon dioxide is no exception. And here CARDOX' experience is literally years ahead!

With thousands of installations, *plus* years of creative research concentrated by war and high priority projects—CARDOX' knowledge in the engineering and manufacture of low pressure carbon dioxide fire extinguishing systems is unparalleled. Protecting many of the world's toughest hazards, CARDOX Systems* have saved industry from uncountable losses in dollars and production.

A survey of your hazards by CARDOX puts this experience at your service. It can be of great value to you—and it costs you nothing. Why not write for a CARDOX *survey* now?

*Covered by Patents, Issued and Pending.

CARDOX

ORIGINATOR OF **LOW PRESSURE CO_2**

FIRE EXTINGUISHING SYSTEMS

CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS

Offices in Principal Cities

by the Westinghouse Electric Corp. in East Pittsburgh, Pa. The second unit will be installed in the near future, along with two 25,000-hp Westinghouse wound-rotor induction motors. Each 83,000-hp motor stands 21½-ft high, and weighs 225 tons. Their 122-ton rotors will turn at 600 rpm.

Five Compressors

In addition to the 216,000-hp four-motor drive, the rotating machine will have five compressors, now under construction at the Westinghouse plant in Sunnyvale, Calif. Work on these transonic and supersonic compressors is not expected to be completed for at least another year. The transonic compressor will be a single unit, but the supersonic compressor will be made up of four compressors coupled as one.

Solid Forged Blades

Blades for the compressors measure 2 ft across the face, are 6 ft long, and will be mounted on a spindle 18 ft in diam. Weighing almost two thirds of a ton each, the blades will be solid forgings.

Although the machine will have the highest stored energy of any rotating mass ever built, it can be brought to a halt in about three minutes by using its wound-rotor motors as brakes, the energy being dissipated in liquid rheostats.

During operation, the wind tunnels will require 100,000 gal of cooling water per minute to reduce the air discharge temperature to about 600° F. However, air in the test chamber will be about 100° F below zero. The transonic wind tunnel is scheduled for completion early in 1955. The supersonic tunnel will be completed in 1957.

Use Machines to Study Hot Boxes

Two testing machines recently developed by Armour Research Foundation of Illinois Institute of Technology will be used in studies to cut down hot boxes on railroad freight cars. An actual freight car truck is used for measurement of heat characteristics of journals.

Turn Page

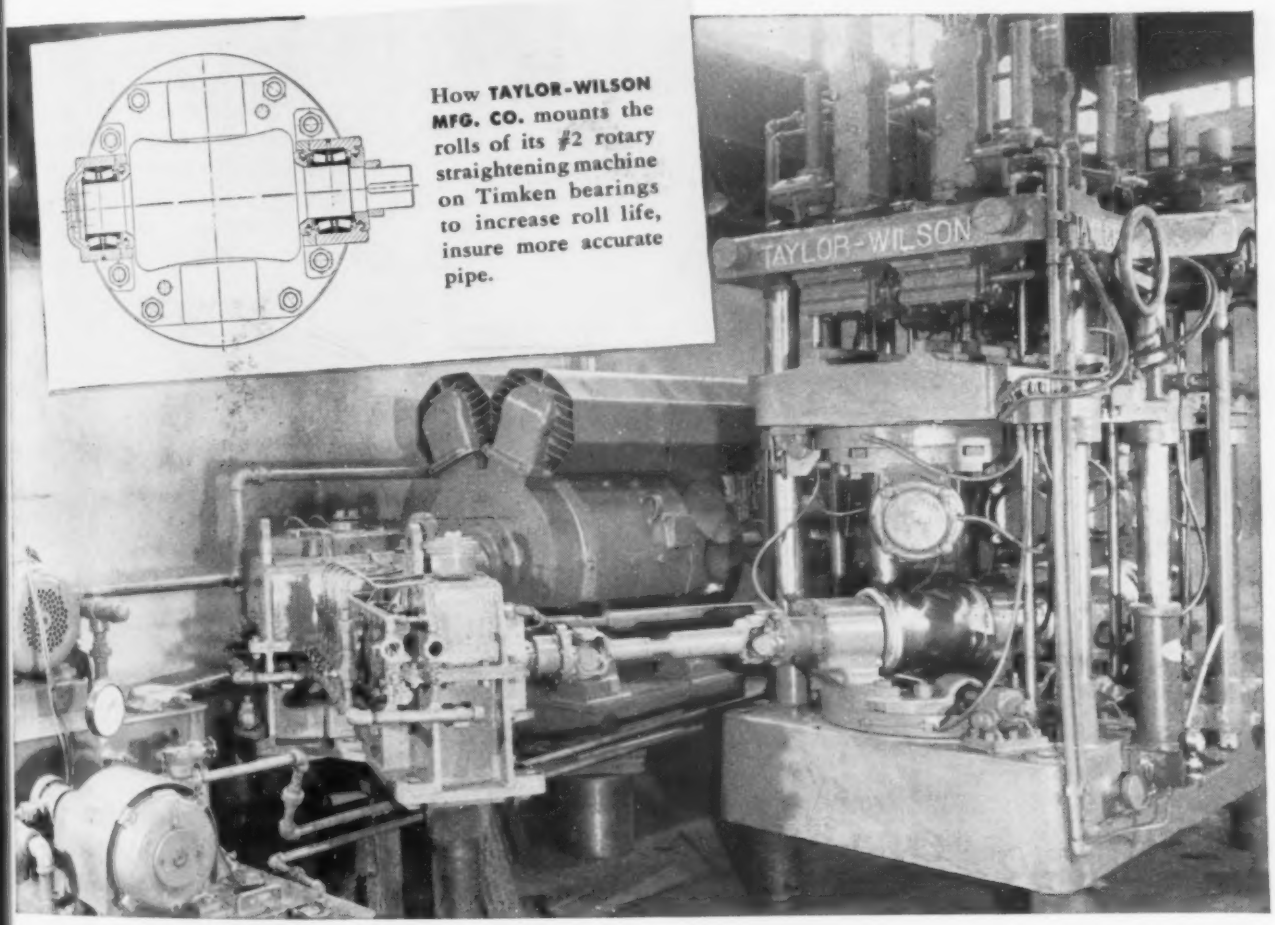
Straightens pipe at rate of 700 feet a minute with rolls on TIMKEN® bearings

JUST imagine the force required to straighten .840″ to 4.5″ O.D. pipe at speeds up to 700 feet a minute! Pipe straightening machines have to be rugged—that's why Taylor-Wilson engineers mounted the driven and idler rolls of their #2 rotary straightening machine on Timken® tapered roller bearings and why they use Timken bearings throughout the drive.

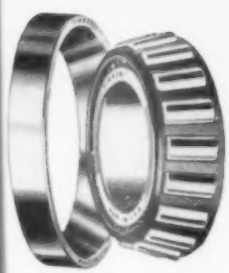
Timken bearings help increase roll life by maintaining path alignment. Their tapered construction takes all radial and thrust loads in any combination. They hold rolls rigidly, keep them rolling true. Pipe is straightened more accurately.

You can put these same advantages *and more* to work for you. Just specify Timken bearings in the machinery you build or buy. Make sure the trade-mark "Timken" is stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



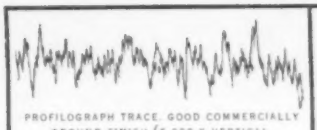
How **TAYLOR-WILSON MFG. CO.** mounts the rolls of its #2 rotary straightening machine on Timken bearings to increase roll life, insure more accurate pipe.



TIMKEN

TRADE-MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS



PROFILOGRAPH TRACE, GOOD COMMERCIALLY GROUND FINISH (5,000 X VERTICAL, 30 X HORIZONTAL)

PROFILOGRAPH TRACE, TIMKEN BEARING FINISH (5,000 X VERTICAL, 30 X HORIZONTAL)

OPTICAL FLAT, PERFECT FINISH

SMOOTH TO MILLIONTHS OF AN INCH

Surface finish of high quality Timken bearing rollers and races is so smooth that it takes a profilograph to measure its smoothness. This instrument measures surface variations to a millionth of an inch, as shown at the left.

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL AND THRUST ⊣⊢ LOADS OR ANY COMBINATION

STANDARD STOCK SIZE JOHNSON sleeve BEARINGS FROM YOUR LOCAL

Johnson Distributor

JOHNSON **GP** BEARINGS

These GP (General Purpose) Cast Bronze Bearings run from ¼" to 4½" ID, 213 ID-OD combinations, up to 21 lengths of a given size.

JOHNSON ***LEDALOYL*** BEARINGS

Powder Metallurgy Ledaloyl Self Lubricating bearings in plain, flanged and self-aligning types.

JOHNSON ***EM*** BEARINGS

Electric Motor EM Bearings are available for all popular motors. Equal to or better than original bearings.

JOHNSON UNIVERSAL BRONZE BARS

Cored, solid and hexagon bars, 13 inches long. All except hexagon bars completely machined ID, OD and ends.

JOHNSON JB BEARINGS
Sleeve-Type

BABBITT METAL

Tin base and lead-base Babbitt in 7 pound bars.

Over 200 sizes

JOHNSON GRAPHITED BEARINGS

Cast Bronze Graphited Bearings provide 40 to 45% graphite contact with shaft, for applications difficult to lubricate, or where ordinary lubricants may damage goods in process.

Write for catalog

JOHNSON BRONZE COMPANY • • • 505 South Mill St., New Castle, Pa.

—Technical Briefs—

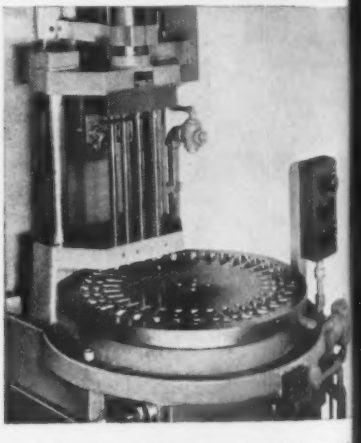
MACHINING:

Rocker arms broached at 1800 per hour rate

Continuous strip-broaching and burnishing of approximately 1800 automotive rocker arms per hour is achieved with minimum effort on a Colonial 10-ton, 36-in. stroke press. The installation includes indexing table fixture plus automatic ejection.

After broaching, the rocker arms simply drop through slots in the indexing table, and through a chute into a container. The operator merely drops the parts in recesses of the table as it indexes past him.

Machine operation is continuous. The rocker arms are broached four at a time, approximately 0.010 in. stock being removed. Burnishers on the broaches reduce drag on the return stroke, permitting fast strip-broaching with long tool life.



ROCKER ARMS are broached at high speed on this unusual broach with indexing table for rapid feed.

WELL DRILLING:

Automatic system prevents drilling string loss

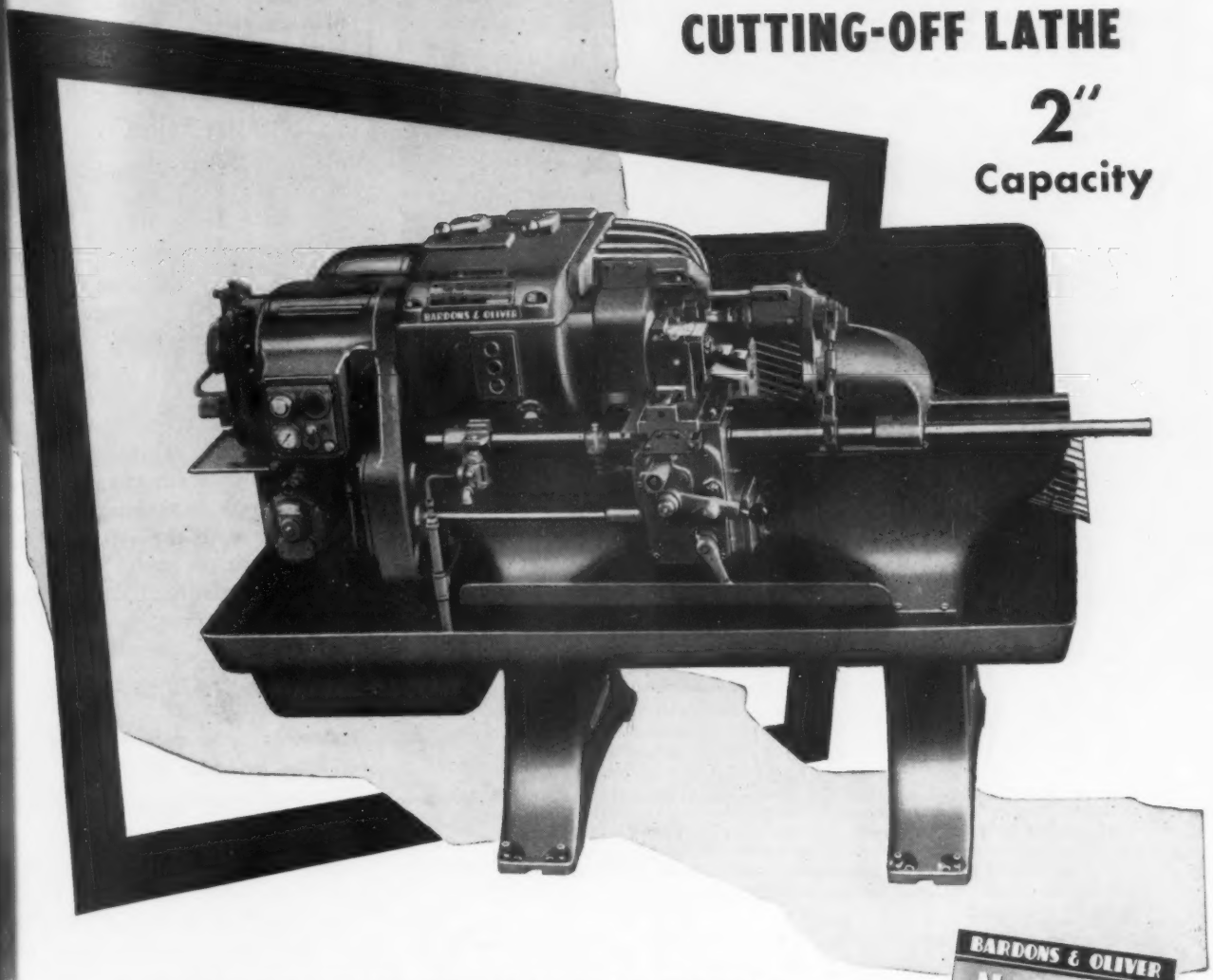
Development of an automatic feed-off control that will either maintain a predetermined weight on a drilling bit, or feed off the drilling string at a predetermined rate of bit penetration, has been announced by The National Supply Co.

Known as the Ideal Micromatic Drilling Control, the design is based on the fact that the load

Turn Page

Improved...

BARDONS & OLIVER
MODEL NO. 32
AUTOMATIC
CUTTING-OFF LATHE
2" Capacity



Increased Rigidity and Sturdiness of the entire tool feeding mechanism results in more continuous production and assures a longer, accurate life of the machine.

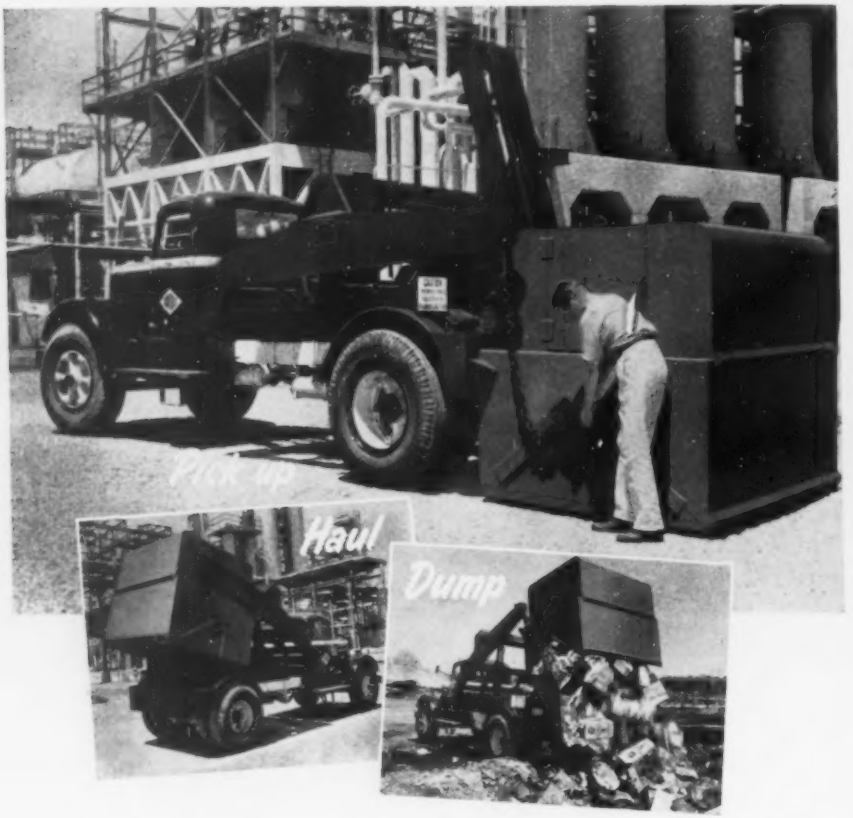
The machine is capable of over 100 cycles per minute . . . its production *AVERAGE* is 30,000 pieces in an 8 hour day. Highly productive for nipples, couplings, ferrules, bushings, spacers, and all other tubular products.

Write us on your company's letterhead for this new Catalog.

BARDONS & OLIVER, INC.

1136 WEST 9TH STREET • CLEVELAND 13, OHIO

Here's a One-Man Bulk Materials Handling System for Your Plant



IN THE Dempster-Dumpster System of bulk materials handling only one man, the driver of the truck-mounted Dempster-Dumpster, is required for operation. The Dempster-Dumpster serves scores of detachable Dempster-Dumpster Containers. Container capacities range up to 4 times that of conventional dump truck bodies and each container is designed to suit the materials to be handled—be they solids, liquids or dust . . . hot or cold . . . bulky, light or heavy. You simply place these containers at convenient materials accumulation points inside or outside buildings. When loaded each container is picked up, hauled and emptied (as shown above) or load set down intact. Entire operation is handled by hydraulic controls in cab.

Containers shown below are just a few of the many available or that can be built to meet your needs. They enable you to handle, at tremendous savings, materials of many descriptions—trash and waste materials, raw materials, finished products, etc.—with only one truck and only one man, the driver. Write to us for complete information. Manufactured exclusively by Dempster Brothers, Inc.

One Truck-Mounted
Dempster-Dumpster Handles Scores
of Containers . . . All Designs . . . All Sizes

DEMPSTER BROTHERS, 493 N. Knox, Knoxville 17, Tennessee

on the drilling string is always under direct control of a simple mechanical brake, which is normally urged toward the "on" position. Any failure of the system automatically applies the brake, making it impossible to drop the drilling string. It is designed for either automatic or manual control of bit penetration.

Selector Switch Control

If the selector switch on the driller's control board is set on "automatic," the system responds immediately to formation changes, translating these changes automatically into whatever rate of feed is required to maintain any predetermined bit weight.

If, on the other hand, the selector switch is set on "manual," the control regulates the feed-off so that a predetermined and uniform drilling rate is maintained in accordance with the setting of the manual control knob. The system retains control of the drilling string at all times.

METALLURGY:

Develop better method for cold rolling magnetic alloy

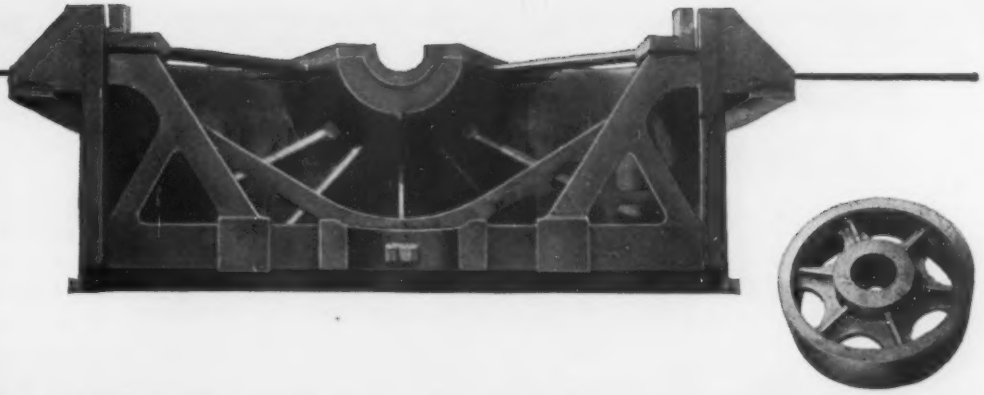
A new "soft" magnetic material composed of noncritical metals has been developed in the Magnetics Division, Naval Ordnance Laboratory, White Oak, Md. Named 16-Alfenol, the new material is composed of 16 per cent aluminum and 84 per cent iron.

The alloy itself actually is not new. It has been known for some time. In fact, it was used in several applications by the Japanese during World War II. None of these were completely successful due to the extreme hardness and brittleness of the metal. It could not be rolled in sheets efficiently because of these properties.

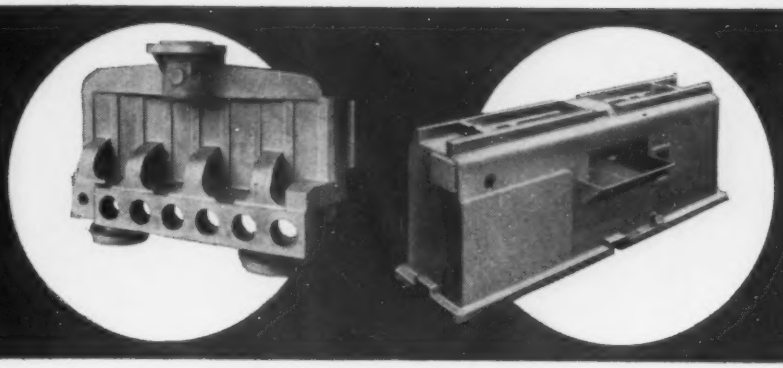
However, the metallurgists at NOL were interested in the properties of this alloy, which did contain no critical metals and showed magnetic properties which should make it valuable in many applications.

Turn Page

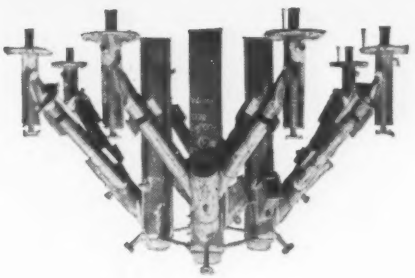
big
or
small



ferrous
or
non-ferrous



simple
or
intricate



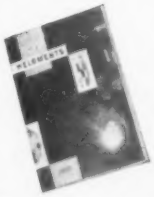
you can rely on . . .

GRAVER weldments

Quality is evident in every Graver job—whether it be a simple or intricate weldment. This is assured by Graver's complete inspection service, extra-large capacity heat-treating facilities for stress relieving, close quality control, plus the employment of the newest welding techniques by highly skilled personnel.

Carbon and alloy steels, aluminum, clad, and stainless weldments are commonplace with Graver. A complete engineering service is at your disposal, and Graver's Weldment Division will re-design your units to reduce manufacturing costs. Graver is equipped to handle thicknesses from 1/4 inch to 12 inches, maintaining closest tolerances.

Look to Graver . . . experts in metal fabrication . . . as *your* weldment source.



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Graver has just completed a new authoritative booklet illustrating the many applications of Weldments in Industry. Send for your free copy. Address: Weldment Division

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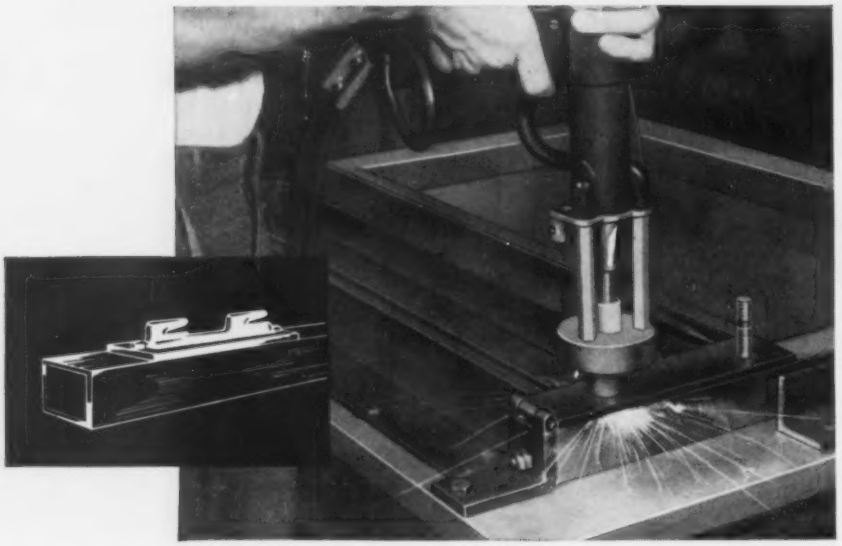
GRAVER
WELDMENTS

improved stud welding
through **KSM** engineering

ENGLANDER COMPANY SAVES $10,000 PER YEAR...



with change-over to

KSM ARC WELDED **STUDS**

Large production schedules keep the **Englander Company, Inc.,** Chicago, one of the largest manufacturer of metal beds and bedding products, constantly alert for cost-cutting manufacturing methods. This continuing search by **Englander** recently solved a difficult assembly problem when they put stud welding in their assembly line.

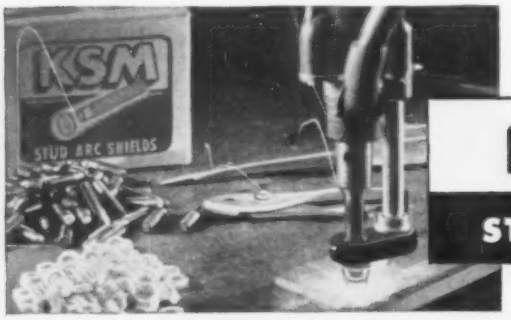
KSM Arc Welded Studs provided the fast, low-cost answer to the problem of securely fastening a spring support to hollow metal bedposts without marring the inside surface.

By changing to KSM Studs, drilling, supporting, peening and hand-filing were eliminated. Estimated savings produced by the change-over to KSM Arc Welded Studs, according to the **Englander Company,** amount to $10,000 on a yearly basis.

How The Problem Was Solved

A simple jig locates two KSM welding studs on each post within a tolerance of .02 inches and positions them perpendicularly. Welds are made instantaneously by merely pulling the welding gun trigger. The precision-centered solid flux, a feature originated by KSM, assures welds that withstand the required 30 foot-pound torque. The spring support is placed on the studs and securely fastened with two nuts.

KSM Arc Welded Studs make the tough, heavy-duty fastening jobs easy and fastening costs lower. Get the benefits of KSM engineering for your stud welding problems. Write KSM Products, Inc., Merchantville, N. J.



KSM
STUD WELDING

—Technical Briefs—

They finally developed a method for cold rolling the alloy at 575°C and found that it could be formed into thin tapes showing the desired magnetic properties. When the NOL researchers got these thin strips, only a few thousandths of an inch thick, they found that the alloy had become tougher and more ductile.

Properties Improved

The metal tapes showed isotropic magnetic properties, and a high bulk resistivity which prevented electrical losses. It furthermore "grew" its own insulating layer when rolled, which in some magnetic applications would mean that one step in the fabrication process could be eliminated. The Alfenol strips are lighter in weight than are many of the materials showing similar properties, and, in certain applications, should do a better job than the materials now used.

CORROSION PROTECTION:

Superior resistance of vinyl coating systems utilized.

Improved life for metals in chemically corrosive installations are claimed possible with a recently developed vinyl coating system. The new system, developed by Prufcoat Laboratories, Inc., New York, combines advantages of drying-oil primers with

BETTER PROTECTION from corrosion is claimed for Prufcoat CP Vinyl system. Here are girder and steel ladder at Kuehne Chemical Co. plant, Elizabeth, N. J., after 14 months' exposure to sodium hypochlorite.

Turn Page

BIRDSBORO

Builds the First and Only

URANIUM ROLLING MILL

and the A.E.C. says:

"... an outstanding performance in designing and manufacturing a special mill to roll uranium for the United States Atomic Energy Commission."

"... an extraordinary achievement in terms of speed ... a credit to your Company, and to the high ability of your staff."

UNITED STATES
ATOMIC ENERGY COMMISSION
NEW YORK OPERATIONS OFFICE

April 3, 1953

Mr. J. M. McCauley, President
Birdsboro Steel Foundry & Machine Company
Birdsboro, Pennsylvania

Dear Mr. McCauley:

It is with pleasure that I commend Birdsboro Steel Foundry & Machine Company, and in particular the Engineering Department of its Rolling Mill Division, on an outstanding performance in designing and manufacturing a special mill to roll uranium for the United States Atomic Energy Commission. Not only was this an extraordinary achievement in terms of speed, but the costs of the mill have been held well in line with the original estimates which were projected from quite sketchy information. This is indeed a credit to your Company, and bespeaks the high ability of your staff. . .

Again I wish to thank and commend you, and through you the Birdsboro staff, on an excellent job.

Very truly yours,

H. B. Fry
Manager

MiHF:ab

•This primary Birdsboro mill, followed by a continuous Birdsboro finishing mill, built under contract for Catalytic Construction Co., is used to roll uranium into bars for further fabrication into slugs used in nuclear reactors.

BIRDSBORO brought more than 58 years of experience and engineering skill to bear on the task of producing the new uranium rolling mill for the A.E.C.'s uranium production center at Fernald, Ohio. Today, the mill—first and only one designed for production rolling of uranium—is in steady, high volume production.

Now, as in the past, BIRDSBORO offers you this same experience and know-how in your search for better, lower-cost mill rolling operations. Make it a point to call in BIRDSBORO engineers.

BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PENNA. **STEEL MILL MACHINERY** Offices in Birdsboro, Pa. and Pittsburgh, Pa.

•**designers and builders of:** Steel Mill Machinery • Hydraulic Presses • Crushing Machinery • Rolls • Special Machinery • Steel Castings

FOR TROUBLE-FREE PERFORMANCE ON YOUR PRESSES . . .

Specify

FOLLANSBEE

COLD ROLLED STRIP

Follansbee Cold Rolled Strip can be fed right from the coil into your high-speed presses with every assurance of smooth, trouble-free performance.

Custom-made in a wide range of tempers and finishes for virtually any automatic press requirement, Follansbee Cold Rolled Strip fits right into the production line.

Follansbee mill facilities assure a firm supply of custom-quality Cold Rolled Strip delivered from the mill directly to you for all your production needs.

Forming and stamping operations are never a problem with this highly desirable Cold Rolled Strip Steel. Just consult your trained Follansbee Steel Representative. He will be glad to discuss your fabricating problems with you.

FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES, PITTSBURGH 30, PA.

Cold Rolled Strip — Seamless Terne Roll Roofing

Polished Blue Sheets and Coils

Sales Offices—Chicago, Cleveland, Detroit, Indianapolis, Kansas City, Los Angeles, Milwaukee, Nashville, New York, Philadelphia, Rochester, San Francisco, Seattle; Toronto and Montreal, Canada. Mills—Follansbee, W.Va.

FOLLANSBEE METAL WAREHOUSES

Pittsburgh, Pa. Rochester, N.Y. Fairfield, Conn.

the chemical resistance of the vinyls, it is claimed.

Maintenance men have often dreamed of utilizing the inherently superior wetting and penetrating properties of drying-oil primers and then providing such primers with the excellent chemical resistance protection offered by vinyl top coats. However, many practical difficulties have stood in the way of putting this desirable concept into practice.

Problem Licked

The active solvents in vinyl formulations would frequently soften and lift the primer undercoat. And adhesion of the vinyl top coats to the primer invariably was inferior, inviting premature failures.

The newly developed Prufcoat Primer P-50, was formulated for use with active-solvent synthetics, and particularly with vinyl coatings. This development is the key to the new, corrosion-controlling and cost-cutting vinyl system.

Essential Minimum Thickness

Studies with synthetic resin protective coating systems have shown that it is possible to establish a coating thickness requirement for plane areas which is necessary in order to insure a low probability of early failure.

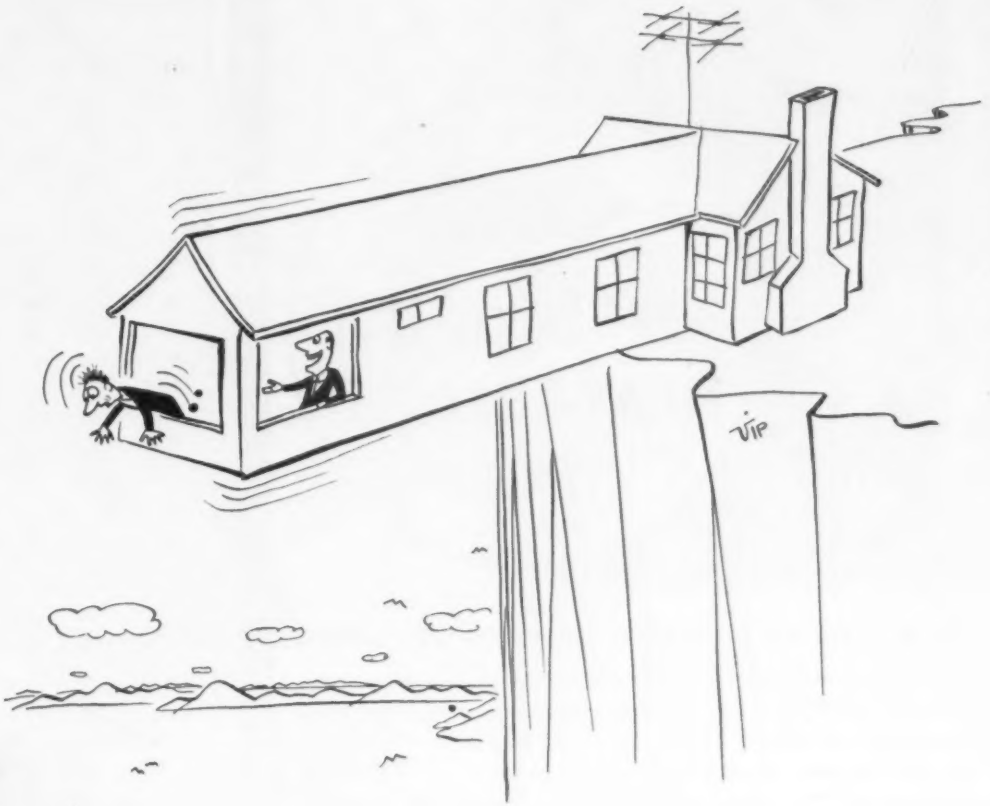
Since coatings "build" at a slower rate on prominences than on flat surfaces, this optimum flat area thickness requirement is important only insofar as it provides for the important "essential minimum thickness" at edges, projections, welds, and other surface irregularities. It is at such critical surface points that protective coating applications usually show first signs of failure.

Greater Edge Build

With most synthetic coating systems, and particularly with those employing either no primers or primers which are light in body and of low "build," it has been established that a minimum of 5 to 6 mils total system thickness on plane areas is required to attain this important "essential min-

Turn Page

What's Screwy? by Phillips



"Don't let it worry you. Everything is made fast with Phillips Cross-Recessed-Head Screws."

PERFECTLY MATED! Only Phillips Drivers are perfectly mated to Phillips Screws. Look for the name Phillips on the shank.

VIBRATION RESISTANCE because of added structural strength is only one of the exclusive advantages gained by using Phillips Screws. These screws set up tighter and their distinctive design gives them maximum strength of head. And that's not all. Because they are unusually easy to drive, they cut driving time up to 50%, eliminate driver skids and split screw heads. You save time, work, money when you use Phillips Screws — Wood, Machine, Tapping Screws or "Sems."

PHILLIPS *Cross-Recessed-Head* SCREWS

X marks the spot... the mark of extra quality

AMERICAN SCREW COMPANY • ATLANTIC SCREW WORKS, INC. • THE BLAKE & JOHNSON CO.
CENTRAL SCREW COMPANY • CONTINENTAL SCREW COMPANY • THE EAGLE LOCK COMPANY
ELCO TOOL AND SCREW CORPORATION • GREAT LAKES SCREW CORPORATION • THE H. M. HARPER CO.
THE LAMSON & SESSIONS COMPANY • NATIONAL LOCK COMPANY
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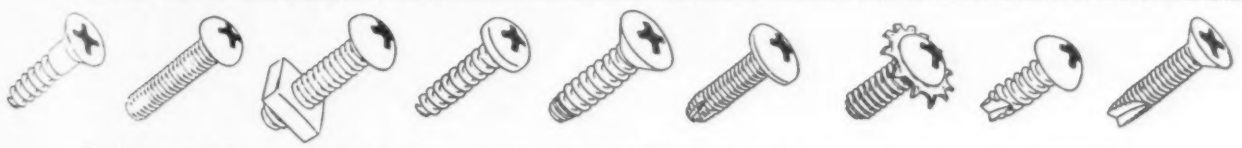
PHEOLL MANUFACTURING CO. • ROCKFORD SCREW PRODUCTS CO. • SCOVILL MANUFACTURING CO.
SHAKEPROOF DIV. OF ILLINOIS TOOL WORKS • THE SOUTHINGTON HDWE. MFG. COMPANY
STERLING BOLT COMPANY • STRONGHOLD SCREW PRODUCTS, INC. • WALES-BEECH CORP.



TODAY'S...AND THE FUTURE'S...FINEST FASTENER

OVER ONE HUNDRED YEARS OF CONTINUOUS SERVICE. ROUNDS, SQUARES, FLATS, HEXAGONS, OCTAGONS

HY-TEN

"B" No. 3X HEAT-TREATED BARS

BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS

This higher-priced alloy steel can save you money!

"B" No. 3X heat-treated bars offer many production economies, even though machined at about ¾ths the speed of annealed bars. They are supplied to your desired physical properties, and can be machined more easily than standard heat-treated bars with equivalent properties. The expense of scaling, distortion, straightening, and often grinding, are eliminated — as well as the cost of extra handling and heat treating of finished parts!

Although the cost is a little more than for ordinary annealed stock, a trial order will convince you of the true economy of HY-TEN "B" No. 3X heat-treated bars! Just call your nearest WL representative.

Write today for your FREE COPY of the Wheelock, Lovejoy Data Book, indicating your title and company identification. It contains complete technical information on grades, applications, physical properties, tests, heat treating, etc.

WHEELOCK, LOVEJOY & COMPANY, INC.

Warehouse Service

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CHICAGO • HILLSIDE, N. J.
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SANDERSON-NEWBOULD, LTD., MONTREAL

HY-TEN and AISI

126 Sidney St., Cambridge 39, Mass. and Cleveland • Chicago • Detroit Hillside, N. J. • Buffalo • Cincinnati

—Technical Briefs—

imum thickness" at prominences.

In view of the high surface tension and shrinkage characteristics of most synthetics, it is easy to understand why such an expensive, multi-coat thickness has been necessary to insure adequate protection at vulnerable points.

By affording substantially greater "edge build" than heretofore possible with vinyl coating primers, Primer P-50 serves effectively to safely lower the optimum thickness requirement for plane areas to 4 mils. It automatically provides for faster and heavier "buttering up" of all surface irregularities, insuring high probability of long service at all failure-sensitive edges and projections while at the same time radically lowering the total system thickness it is necessary to attain.

Low Surface Tension

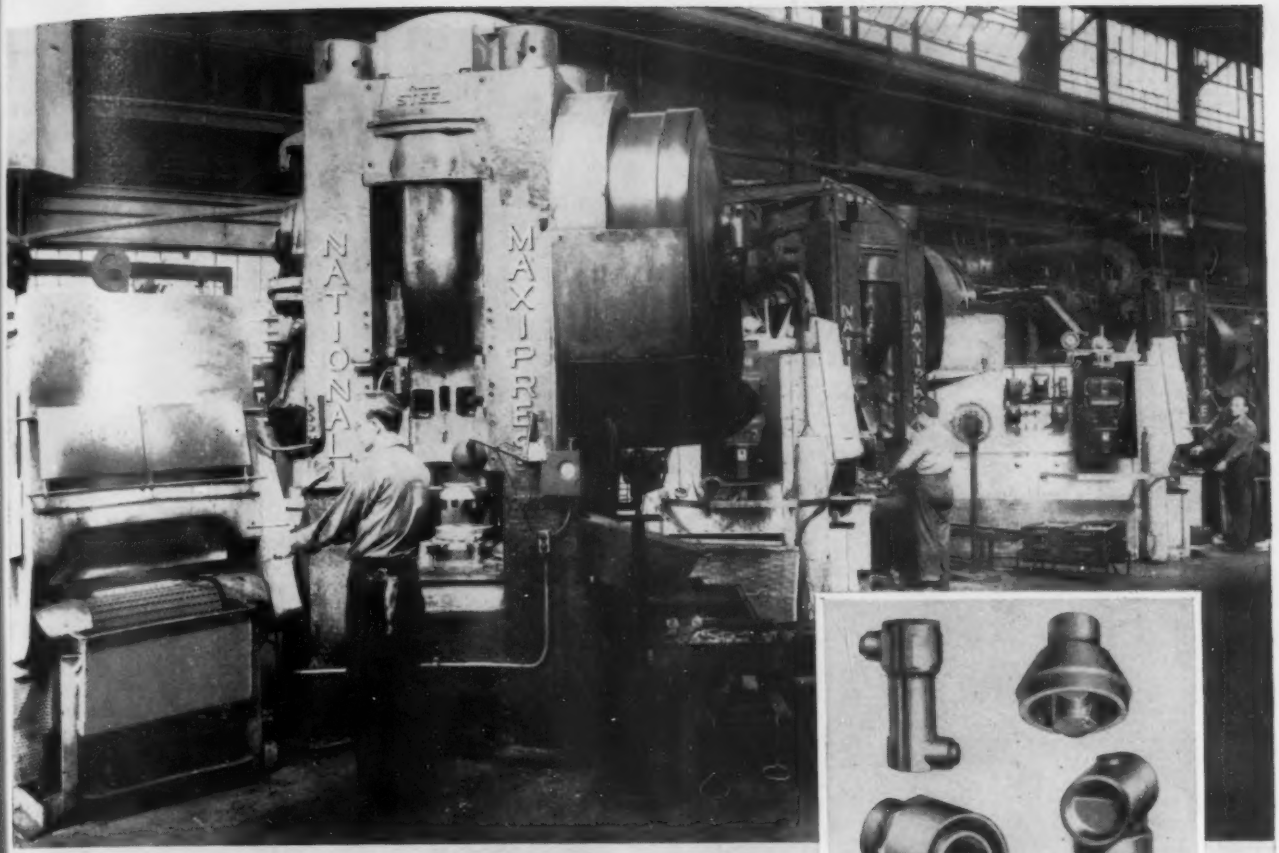
Yielding in one coat approximately 2 mils dry film thickness on flat areas, Primer P-50 is not handicapped with the characteristic high surface tension of the typical synthetic coating and has far less tendency to draw thin over prominences. Its relatively low surface tension, heavy body and high total solids enable the Prufcoat CP Vinyl System to protect all vulnerable points as well as plane areas in a simple, economical and practical 3-coat application, it is claimed.

Positive Adhesion Assured

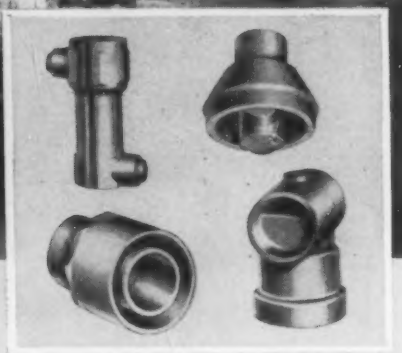
Coating thickness alone, although of great importance, is only one part of the answer to a successful protective coating application. Of equal importance, in any coating system, are primer-to-surface and top-coat-to-primer adhesion.

Enjoying the well-known advantages common to drying-oil primers, Primer P-50 displays excellent all-around adhesion properties. It bonds securely to most metals — iron, steel, aluminum, magnesium, brass, bronze, etc.; and like primers of the red lead and oil variety, also can be depended upon to perform satisfac-

Turn Page



MAXIPRES forging operations at Titan Metal Manufacturing Co., Bellefonte, Pa.



Typical Titan forgings. Note intricate designs.

3600 TITAN Forgings Per Hour

. . . from this battery of

HIGH SPEED FORGING MAXIPRESSES!

Titan Metal Manufacturing Co., Bellefonte, Pa., specialists in quality brass and bronze forgings, is achieving outstanding production rates with this battery of three National High Speed Forging MAXIPRESSES, which reach 1,200 forgings per press per hour!

Titan forgings, many of intricate shapes with thin wall sections, vary in weight from less than one ounce up to 100 lbs. They are precision forgings, due in part to the over all ruggedness and built-in rigidity of the MAXIPRES.

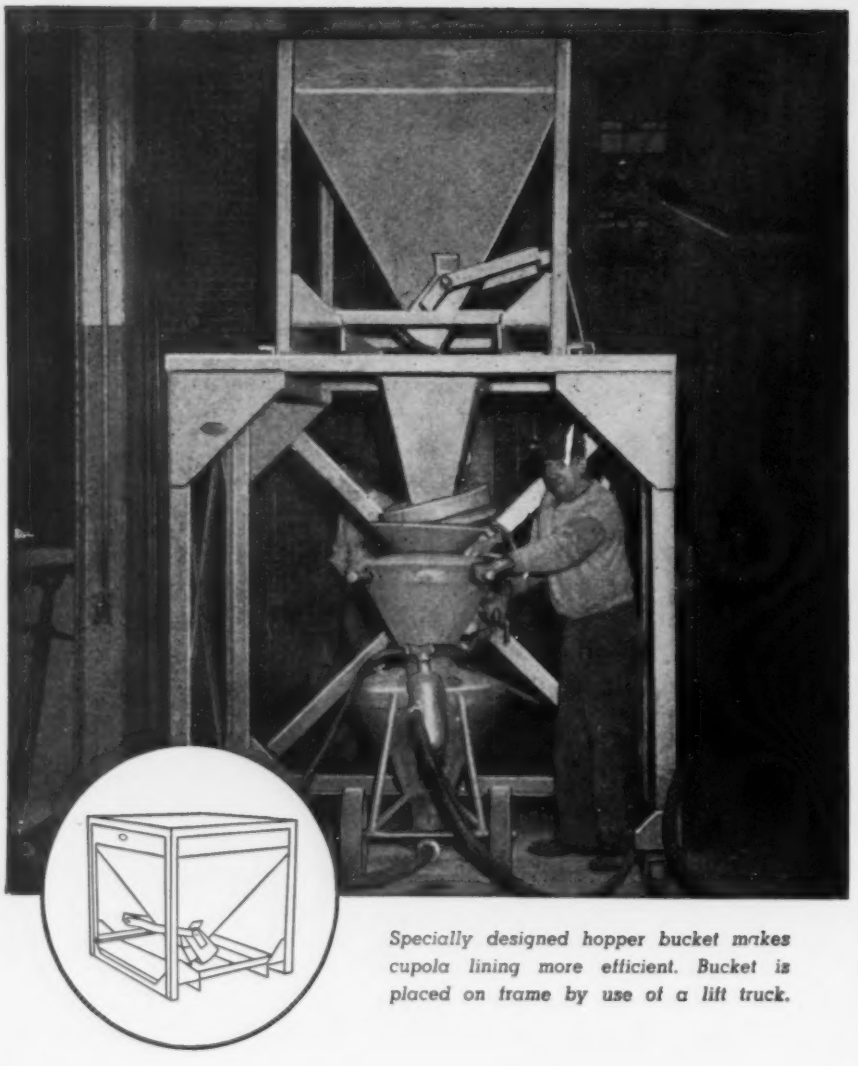
If you have a forging problem—large or small, hot or cold—ferrous or non-ferrous—let us help you solve it. Send us prints, or a sample part, or, better yet, visit us. No obligation.

NATIONAL
MACHINERY COMPANY

TIFFIN, OHIO—SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

Hartford Detroit Chicago



Specially designed hopper bucket makes cupola lining more efficient. Bucket is placed on frame by use of a lift truck.

Solve Your Material Handling Problems With **PENN IRON SPECIAL EQUIPMENT**

In lining cupolas, Textile Machine Works foundry in Reading, Pennsylvania, had difficulty handling the clay mix used with their Bondactor equipment. After a study of the problem, Penn Iron Works, Inc., designed, engineered and manufactured this special hopper bucket for maximum handling efficiency.

Whatever the bulk-material handling problem in your plant, Penn Iron Works, Inc., will be glad to help with its solution. Our wide experience in designing and manufacturing all types of buckets and special handling equipment for foundries can help you cut costs . . . save time . . . increase efficiency.

For Further Information Write:

PENN IRON WORKS, INC.
READING, PENNSYLVANIA

torily over old, corroded, wire-brushed metal. This latter characteristic is highly significant from a practical maintenance viewpoint, particularly in chemical process plant applications where ideal surfaces are rarely encountered.

Vinyl Coatings Adhere

In turn, the dry vinyl primer film presents a surface to which any properly formulated vinyl coating adheres with tenacity.

When the primer has been properly formulated it is not lifted or otherwise adversely affected by vinyl top coat applications, assuring vinyl-to-primer and primer-to-surface adhesion which can be best described as "welded" to the metal.

Finally, the new primer bonds firmly to and is easily applied over most old paints, whether oil-base, rubber-base, vinyl, oleoresinous, etc. This characteristic makes the Prufcoat CP Vinyl System ideal for repainting old, relatively sound painted surfaces in simple accordance with conventional maintenance procedures—by spot-priming or over-all priming with Primer P-50 and then applying a single vinyl finish coat.

AIR CONDITIONING:

Steel plant installs units in pulpits and crane cabs

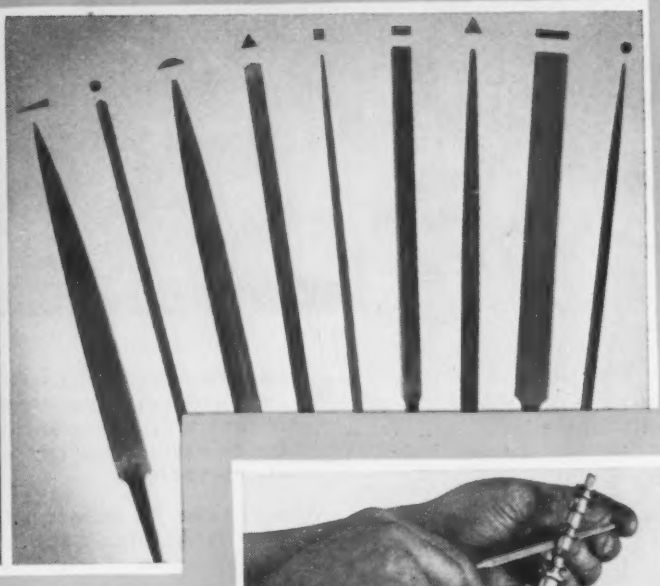
A large western Pennsylvania steel plant has recently air conditioned two pulpits and five crane cabs with notable improvement in productivity and employee relations.

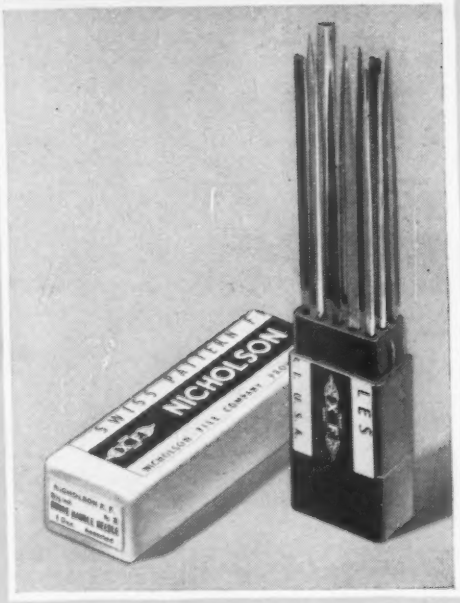
Previous to the installation of this air conditioning equipment, pupit personnel and crane cab operators worked in temperatures which often exceeded 140°F. Now these Lintern Aire-Rectifiers cool and clean the air in these hot spot areas of the plant.

As shown in the photo below, crane operators lift ingots from the soaking pit and deliver to the blooming mill every few minutes. Temperature of the hot ingots

Turn Page

For those close-tolerance filing jobs... Nicholson TRADE X.F. MARK Swiss Pattern Files





"WHEN it's got to be *right*, you've got to be *sure*." That's one of the creeds of the tool, die, model and fine-instrument crafts. One rule toward achieving accuracy in precision work is to use tools which in themselves are correct and of the highest efficiency.

For true fits and fine finishes there can be no compromise on file quality, no equivocating on file cost. Nicholson recognizes this principle, and puts "everything it's got" into putting excellence into X.F. (meaning *E*xtra *F*ine) Swiss Patterns. The shaping, cutting, hardening and finishing of these special file types is in the hands of specialists who work on nothing else.

Nicholson X.F. Swiss Patterns differ from American (regular) Pattern files. They are relatively smaller and finer in cut. Tapers are longer and more pointed. Cross sections are more varied. Individual types include those shown above (left to right)—Knife, Round Straight, Half Round, Metal Saw, Square, Pillar Narrow, Three Square, Equaling, Round Tapered. Others: Hand, Warding, Crochet, Barrette, Slitting, Crossing, Corrugating, Joint, Pippin, Testing. Group assortments: Die Sinkers, Die Sinkers Rifflers, Filing Machine, Broach, Round and Square Handle Needle (in 1-doz. plastic-case assortments if desired).

SOLD THROUGH INDUSTRIAL DISTRIBUTORS

NICHOLSON U.S.A.

NICHOLSON FILE COMPANY
31 Acorn St., Providence 1, R. I.

BLACK DIAMOND MADE IN U.S.A.

(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)

NICHOLSON FILES *FOR EVERY PURPOSE*

YOU *Can* AVOID DIE COSTS COMPLETELY!

On Your Next
STAMPING ORDER

Yes, you can -- but it's not *necessarily* the best thing for you.

You want the lowest unit cost -- *for the life of the part*, including re-runs. It may well be that our **Machine-Cut Method**, with no die cost, does work out best.

Or, it might better be our **Short Run Method**, using economical blanking dies and stock punches.

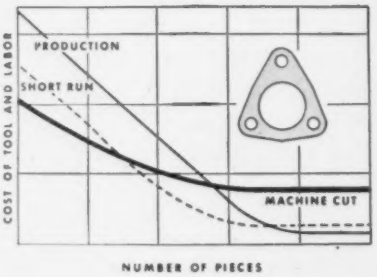
Sometimes, even with very short runs, it pays to use our **Production Method** with a standard die or our own surprisingly inexpensive Hecht-type tool.

In *any* case, the decision is a technical one based on many factors, not just length of run. You save money when the correct decision is made.

WE USE ALL THREE METHODS — LET US MAKE AN IMPARTIAL DECISION FOR YOU

For example, take the part illustrated. From 1-65 parts, our Machine-Cut Method is most economical. At 65 parts, the Short-Run Method is best until, at 7,000 units, the standard Production Method is most satisfactory.

These breaking points as charted vary drastically with every stamping, but the general principle remains the same.



LAMINATED **SHIM** COMPANY, INC.

Manufacturers of ALL TYPES OF SHIMS

STAMPINGS DIVISION

ONE PIECE OR ONE MILLION

STAMPINGS DIVISION, LAMINATED SHIM COMPANY
3209 Union Street, Glenbrook, Conn.

Gentlemen:
Please rush me my free copy of "SERVICE IN STAMPINGS"—the 12-page, illustrated booklet full of helpful facts on the economical buying of stampings.

NAME_____ TITLE_____

COMPANY_____

STREET_____

CITY_____ ZONE_____ STATE_____

leaving the pits is 2400°F. Although the operator in his cab is but a stone's throw from this excessive heat, the cab is maintained at a comfortable 80°F.

Searing Temperatures

Likewise, the pulpit personnel must necessarily work directly over the receiving table where the red hot steel is delivered. Previously, they were constantly exposed to searing temperatures. These men now work efficiently in a comfortably cooled room of glass and steel.

The Aire-Rectifiers are the "split-system" type. The cooling mechanisms are in the cabs and pulpits. For the cabs, the condenser units are located on the bridge and connected with refrigerant lines to the cab-cooling units. In the case of the pulpits, the water-cooled condenser is located in one of the columns of the pulpit and the cooling units are in the room where the men work.

CRANE cab temperature is maintained at 80°F with air conditioning unit.

Bearing Operation Improved

Frozen bearings in the wheels of overhead oven conveyor trolleys at Simmons Co., Elizabeth, N. J., maker of mattresses, offered a production problem. Ordinary lubricants tended to burn off at high oven temperatures. Solution was found in a dispersion of colloidal graphite in oil.

Turn Page

MASSIVE NEW SIMMONS PIT LATHE
performs above specifications
FOR LUKENS STEEL

MACHINES 14-FOOT-DIAMETER ALLOY STEEL DRYER ROLLS

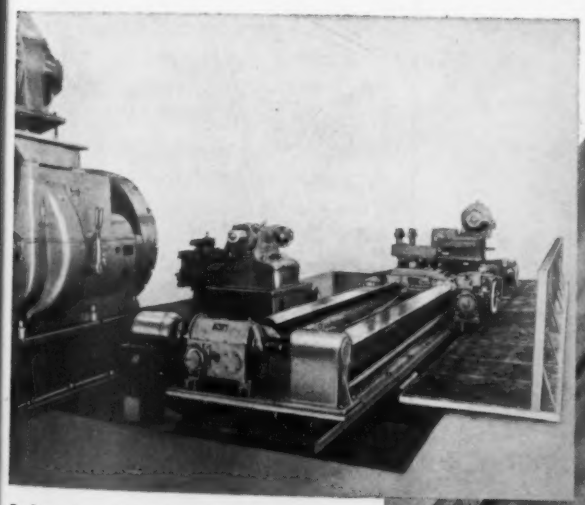
Simmons engineers designed and built this unusual lathe to meet Lukens Steel Company's problems in machining the outer surfaces of their Steam Jacketed Dryer Rolls.

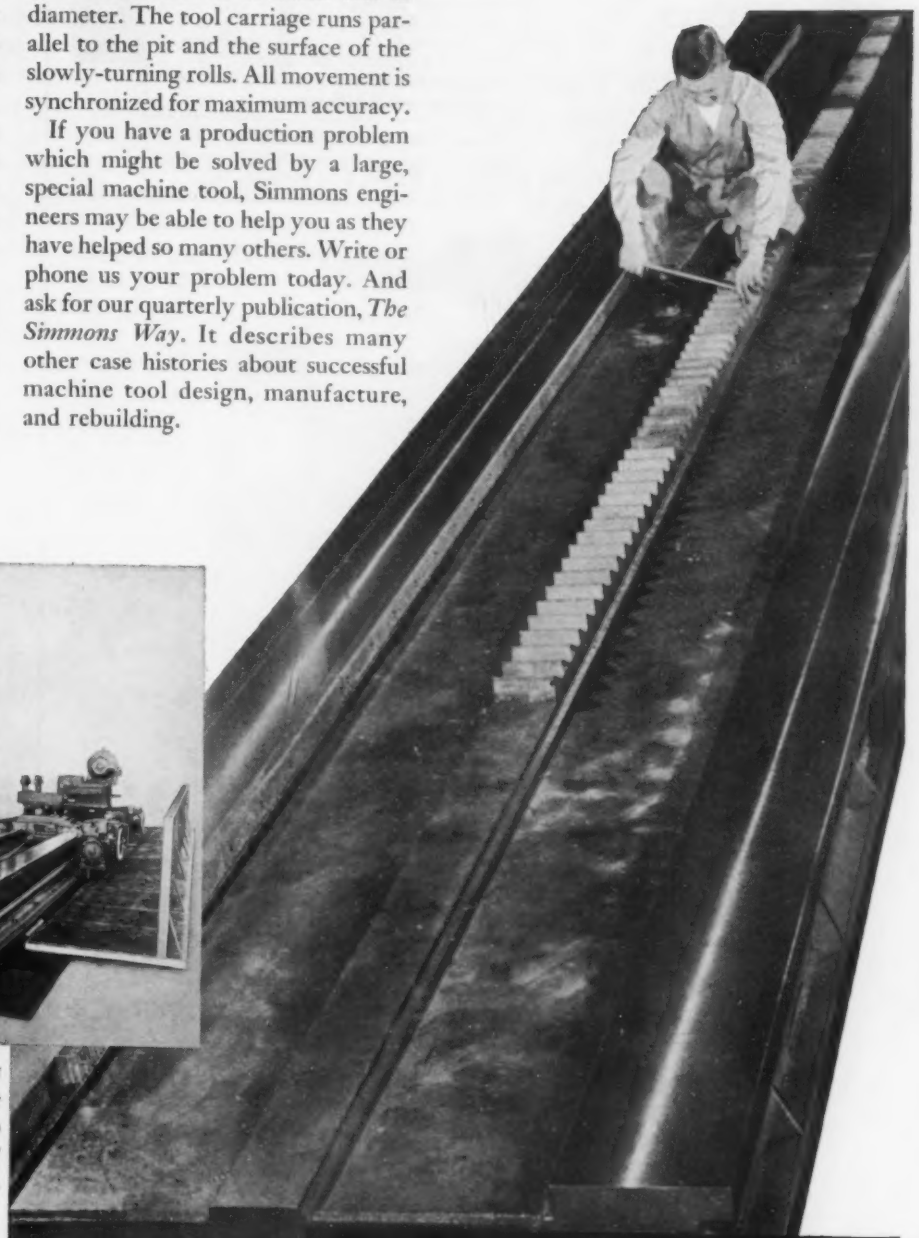
These unwieldy rolls, which run as large as 14 feet in diameter with 30-foot centers, had to be precision machined to a smooth, highly-polished finish. Any irregularities would result in poor heat transfer.

RESULT: *Lukens engineers report that this pit lathe is performing above the specifications that they originally set.*

Turning and grinding carriages on the lathe are motor-driven over the length of a 42-foot bed and can work rolls from three to fourteen feet in diameter. The tool carriage runs parallel to the pit and the surface of the slowly-turning rolls. All movement is synchronized for maximum accuracy.

If you have a production problem which might be solved by a large, special machine tool, Simmons engineers may be able to help you as they have helped so many others. Write or phone us your problem today. And ask for our quarterly publication, *The Simmons Way*. It describes many other case histories about successful machine tool design, manufacture, and rebuilding.





End-on view *of Luken's Pit Lathe shows pit needed for free clearance of large diameter rolls. Carriage travels length of pit.* **At Right:** *42-foot, 17-ton bed of the lathe; ways were finish-ground to 0.002 in.*

SIMMONS—FOR THE LARGE SPECIAL MACHINE TOOLS THAT OTHERS SELDOM BUILD

SIMMONS MACHINE TOOL CORPORATION, 1721 North Broadway, Albany 1, New York

New York Office: 50 East 42nd Street, New York 17, New York

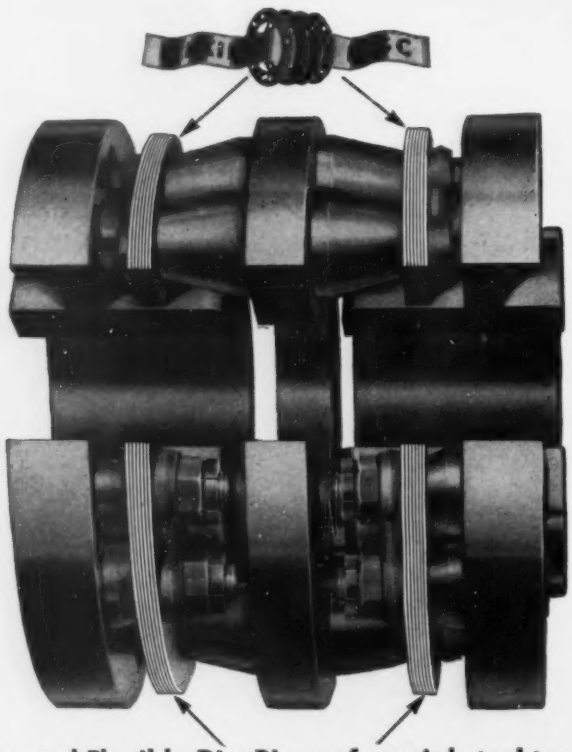
In Philadelphia, phone: Victor 8-3133

In Pittsburgh, phone: Penhurst 1-3700

AVOID COSTLY SHUT-DOWNS!

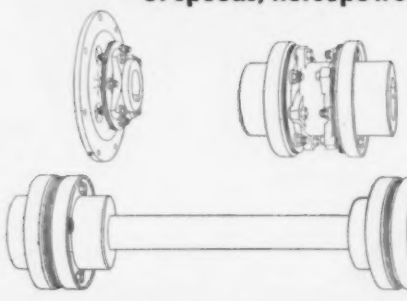
Specify THOMAS Flexible Couplings for Power Transmission

DISTINCTIVE ADVANTAGES of THOMAS ALL-METAL COUPLINGS	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes.



THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

MANUFACTURERS OF FLEXIBLE COUPLINGS ONLY FOR OVER 35 YEARS

Write for our new Engineering Catalog No. 51

THOMAS FLEXIBLE COUPLING COMPANY

WARREN, PENNSYLVANIA, U.S.A.

—Technical Briefs—

QUALITY CONTROL:

Spectrometry lab keeps tabs on large scale production.

Quality of the cylinder block casting determines the quality of the motor car. This thought is symbolic at Ford's Cleveland Foundry. A major factor in this control is the spectrometry laboratory where a Baird Associates direct reading spectrometer controls the quality of the casting metals.

Presently, three of the foundry's ten cupolas are operated alternately. Samples are taken at ½-hr intervals, sent to the laboratory by transit tube, analyzed and reported back to the melter in an overall time of 15 min. Carbon and sulphur are analyzed by the volumetric method. This short time element between sampling and reporting aids in quality production of 1500 motor blocks and component parts per shift.

Operation Simple

Melted iron from the three banks of cupolas pours into the gasfired forehearths and from there into transfer ladles. From the transfer ladles, samples for test bars and pins are taken by the chill man. The pins, formed in molds, are 7/32 in. x 1¼ in. when cool, they are placed in an envelope, labeled, and sent by transit system to the analytical laboratory.

The shift spectrographer receives the pins and 30 sec later has them prepared and placed in the electrode holder. He then pushes

CONSOLE of direct reading spectrometer gives almost instantaneous quantitative determinations of foundry samples.

the start button. A high-voltage arc excites the iron and causes it to emit light. From calibrated clock dials on an adjoining console, almost instant quantitative determinations are read. These analyses are used to hold the quality of the melt to specifications.

The spectrometer works like an emission spectrograph except that photomultiplier tubes are substituted for photographic plates. An electronic system translates spectral energy to time readable on clocks, one for each element, as the measure of concentration. Each element controlled has its own interchangeable relay and condenser drawer. All electronic components for one element, between the photomultiplier and the clock dials, are located within these drawers. Thus simplicity of operation and maintenance is assured.

Substantial Savings

Determinations now made are at the rate of 20,000 per year with one man per shift handling the spectrometer. Savings in man power are substantial. The cost of expensive chemical reagents is almost eliminated. There are no darkroom supplies to buy. There is no dirt nor fumes in the laboratory. Control analysts work without strain or hazard.

PART MARKING:

Face end of screw machine parts easily marked with new device.

An unusual marking device for screw machines, which permits die marking of part numbers, patent numbers, trade marks, etc., on the *end face* of parts during the machine cycle, has been developed by New Method Steel Stamps, Inc., Detroit.

Fewer Setups

Suitable for both light and heavy work on automatic and hand operated screw machines, bench and turret lathes, etc., the marker is useful for marking the end face of parts on any diameter of face 1½ in. and up.

The marker eliminates the need

Turn Page

need a forge shop in your plant?

Here it is—not a shop packaged and ready for delivery, but a shop operating at full tilt for firms such as yours. Ours is the kind of forge shop that best complements your operation . . . we can make you shafts, pinions, large or small U-bolts, anchor bolts, spanner wrenches, hex and square head large bolts, and a multitude of other special forgings that are custom-made. All of the parts you see here were "emergency" forgings that had to be made with the speed and efficiency necessary to keep some phase of some plant operating. It will pay you to remember . . . for custom forgings, think first of American Forge.

American Forge and Manufacturing Co.

820 Shore Avenue . Pittsburgh 12, Pa.

Forged shafts • pinions • gear blanks • steel rings • connecting rods • discs • heavy bolts up to 6" dia. • 5 to 100 ton capacity mill hooks • ratchets • load binders • hand and automatic tongs to your specifications

"Forgings for Industry since 1890"

NEW WILLSON Interchangeable Respirator

First truly interchangeable respirator. Requires no additional parts or accessories to use any one of the cartridges, filters, or combinations shown.

For Organic Vapors (BM2308)
For Dusts and Organic Vapors (BM2308)
For Paint Spray
For Acid Gases
For Organic Vapors and Acid Gases
For Ammonia
For Metal Fumes, Dusts, and Mists (BM2149)
For Radioactive and Beryllium Dusts, Mists or Fumes
For Dusts and Mists (BM2162)

These Respirators are individually packed in sealed, transparent plastic bags enclosed in a sturdy metal-edge box.

Write for the new bulletin fully describing these new Willson Respirators. Standardization on the new Willson No. 800 Interchangeable Respirator can greatly simplify your respiratory protective inventory.

More than 300 Safety Products Carry This Famous Trademark

WILLSON®

Established 1870

WILLSON PRODUCTS, INC., 231 Washington Street, Reading, Pennsylvania

for separate setups for marking, reducing cost, scrap, it is claimed. Easy disassembly of the marker for rapid interchange of lettering rolls is possible by removing two Allenhead cap screws. The control mechanism and roll die shaft come off as a unit. This usually can be done without resetting the holder in the machine.

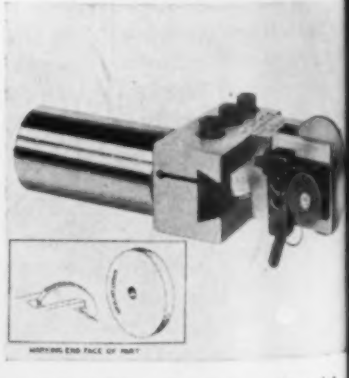
A heavy-duty shank available in standard 2 in. diam maintains marker alignment and insures uniform marking impression. The unit marks once only on each part, eliminating chance of double impressions.

Use Solid or Changeable Type

The marker uses either solid dies or interchangeable type in roll holders if desired. Depth of marking impression is controlled by means of a starting cam on the roll die. Contact point of the cam with the part is shifted to a higher or lower point on the lobe (for lighter or heavier characters) by loosening a lock nut and turning the adjusting screw at the top of the unit.

After proper depth of lettering has been selected for the material being marked, the lock nut is tightened and no further adjustment is needed until the type of part in production is changed.

The cam or "starting pad" extends some distance ahead of the first character, providing variation of marking depth and uniform depth of impression since any machine slack is taken up before actual marking begins.



AUTOMATIC roll marker marks end faces of parts during machine cycle on automatic or hand operated screw machines, lathes. Marker eliminates secondary marking operations.

Turn Page

NEW!

AUTOMATIC power feed

...for all BENCHMASTER HAND-SCREW MILLS!

$125.00 F.O.B. FACTORY

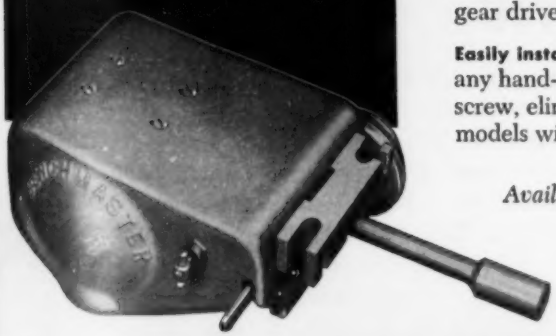
Complete, Ready to-Install and Plug In

MOTOR: 1/15 hp, 110 V. AC 60 Cycle

MECHANISM: Bronze Gear, Steel Worm

WEIGHT: Approximately 10 lbs., Net

DIMENSIONS: 4½" x 5½" x 8", less connecting shaft.



Four speeds in either direction! 1.2, 2.1, 3.2, and 4.5 inches of table travel per minute...all independent of spindle speed and direction of rotation.

Powerful! Table drive equals or exceeds milling capacity of the spindle.

Table travel instantly reversible! Reversible motor and simple two-way switch instantly reverses direction of table feed. Adjustable stops limit table travel in either direction.

Doesn't interfere with manual operation! Lever quickly disengages worm gear drive, permitting use of ordinary hand feeds when desired!

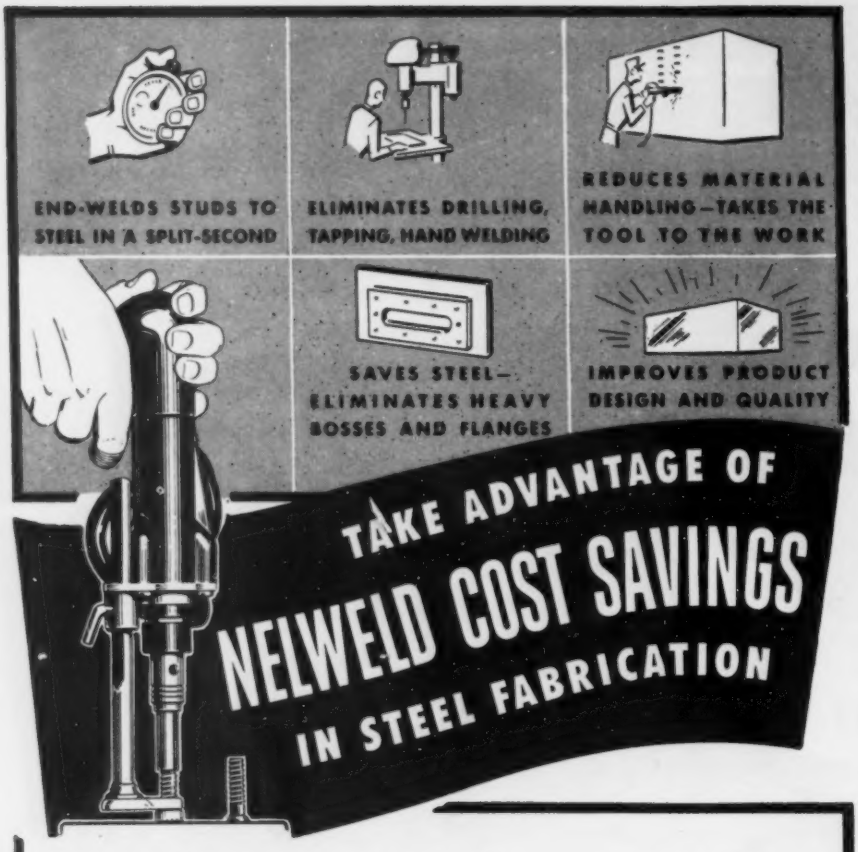
Easily installed in 10-15 minutes! Two bolts secure unit to end of table on any hand-screw model. Slots in adapter permit easy alignment with lead screw, eliminate fussy hole location. (Note—not adaptable to production models with rack and pinion table feed.)

Available factory-installed on all new Benchmaster Mills, or as an accessory for all Benchmasters now in use! See your Benchmaster dealer today!

Benchmaster Manufacturing Company
1835 W. Rosecrans Avenue
Gardena, California

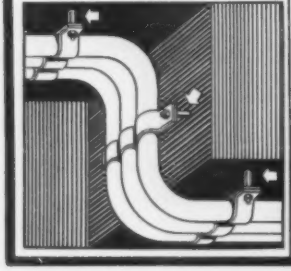
benchmaster

World's largest manufacturer of small punch presses and mills.

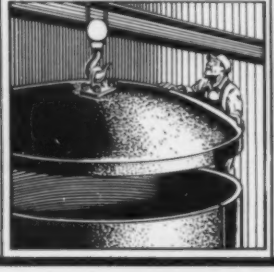

END-WELDS STUDS TO STEEL IN A SPLIT-SECOND
ELIMINATES DRILLING, TAPPING, HAND WELDING
REDUCES MATERIAL HANDLING—TAKES THE TOOL TO THE WORK
SAVES STEEL—ELIMINATES HEAVY BOSSES AND FLANGES
IMPROVES PRODUCT DESIGN AND QUALITY
TAKE ADVANTAGE OF
NELWELD COST SAVINGS
IN STEEL FABRICATION

TO HANG....TO HANDLE....TO HOLD..

Faster installation of brackets or hangers for piping, tubing or conduit.



Fast installation of handling accessories that can be easily removed.



Split second stud welding lowers fabrication costs, improves product.

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... right in your own plant how your production and your products can be improved with this modern fastening method. Your design and production men can actually participate and test the results on your own products.

For full information on Nelweld as applied to steel fabrication, write the Main Office, Lorain, Ohio.

Fasten it Better...at Less Cost, with NELWELD

NELSON STUD WELDING

DIVISION OF GREGORY INDUSTRIES, INC., LORAIN, OHIO

—Technical Briefs—

DEBURRING:

Gears are burred and chamfered in high speed machine.

A universal high speed gear burring and chamfering machine recently developed will fill a long-felt need of gearmakers, it is believed. The machine, developed by Modern Industrial Engineering Co., Detroit, will burr and chamfer the entire tooth form of both helical and spur gears from ⅝ to 9½ in. pitch diameter, as well as external straight and involute form splines.

High productivity is not sacrificed to provide universal features. To chamfer both sides of the tooth and the root on one side of a gear takes less than one-fifth of a second.

Translated into pieces per hour, floor-to-floor, the Burr-Master will finish gears with 22 teeth at a rate of more than 600 per hour, at 80 pct operating efficiency. Behind this high production rate is the fact, once the machine is started, it is not usually necessary to stop for loading and unloading the work station.

Fast Changeover

To be truly universal, a machine must be capable of being changed over from one job to the next with a minimum of delay and without complicated tool changes and adjustments.

Simplicity of precision tooling permits rapid changeover from one part to another, eliminating the need for skilled help.

Tooling consists of a pilot gear, work holding fixture, tool block and form cutter. In setting up for a given part, the tooling is developed for the gear to be burred and chamfered and precisely located on the mounting faces of the machine.

Tested Tooling

Once the tools are developed and tried out on a master machine in Modern Industrial's plant, they may be shipped to any part of the world and dropped into place on the same model Burr-Master by

Turn Page

Ford has installed DRAVO *Counterflo* Space Heaters in 17 of its parts depots

In planning the heating system for 17 of its parts depots in various parts of the country, Ford Motor Company wanted to:

1. Keep floor areas free for maximum storage
2. Heat large warehouse areas
3. Provide uniform heat throughout the area

Typical of the Dravo *Counterflo* Space Heaters installed by Ford is the one illustrated at its Cleveland Parts Depot. Dravo Heaters provide:

ADAPTABILITY—Dravo Heaters are mounted horizontally on overhead girders, 16 ft. above the floor, saving valuable storage space and allowing maximum use of the floor area.

PENETRATION—Dravo Heaters' high-capacity fans re-circulate the air completely throughout the 140,560 sq. ft. area in 25 minutes, despite the tiering of material in uneven heights. Directional louvres guide the flow of air. The area can be warmed quickly in winter and cooled easily in summer.

ECONOMY—Dravo Heaters are thermostatically controlled to keep temperatures constant. Installation cost was kept to a minimum, because no ductwork was required. Minimum efficiency is 80%. Roof heat losses are low.

These and many other advantages can be yours when you install Dravo *Counterflo* Space Heaters in your commercial or industrial building. Write for complete details. Use the coupon.

DRAVO
CORPORATION

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Dravo Corporation, Heating Department
Dravo Building, Fifth and Liberty Avenues
Pittsburgh 22, Pennsylvania

DRAVO

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- ☐ Temporary heating.
- ☐ For use in conjunction with air conditioning.
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40% to 70% cost-saving with Edmont work gloves

job-fitted to your needs

NEOX (reinforced neoprene) coated gloves fit widest range of work

Never before a glove so equally resistant to abrasion, cutting, oil, acids, solvents, caustics, degreasants and heat. Good flexibility and grip. All Edmont coatings are bonded to strong fabric linings for comfort and snag-resistance. Full coated or palm coated.

"Redmont" NEOX gloves for heaviest duty service and safe grip

Non-slip finish, cured *into* 30% thicker red NEOX coating, grips wet or greasy surfaces as well as dry. Longest wearing, safest of all liquid-proof gloves. Seamless wearing surface, extra wide thumb span, curved fingers.

Safety engineers approve white-fabric lined, rubber-coated Grab-its

Tough, flexible, rough-textured natural rubber, bonded to sturdy white fabric lining, gives positive non-slip grip, wet or dry. Outwear ordinary canvas gloves up to 10 times. Far safer, too.

Grapplers grip even in grease; outwear other plastics 50%

Coated with DUROX, a leather-like reinforced plastic that retains its grip when wet, is extremely resistant to abrasion, oil and coolants, and stays flexible. Perfect fitting, too. Note wing thumb and curved, pre-flexed fingers.

Hand-fitting Monkey Grips far outwear leather, ordinary plastics

Special Edmont vinyl coating is second only to "DUROX" in wearing qualities and grip. Same wing thumb and pre-flexed finger design as "Grappler" gloves; fit the hand *all over.*

Make this FREE TEST to cut your costs, improve safety. Send us a brief description (on business letterhead) of your operations, materials handled, and temperature condition. Without cost we will recommend the best glove for the condition and forward samples for testing on the job.

Edmont Manufacturing Company, 1234 Walnut Street, Coshocton, Ohio

World's largest maker of coated industrial gloves

Edmont.

Edmont job-fitted gloves

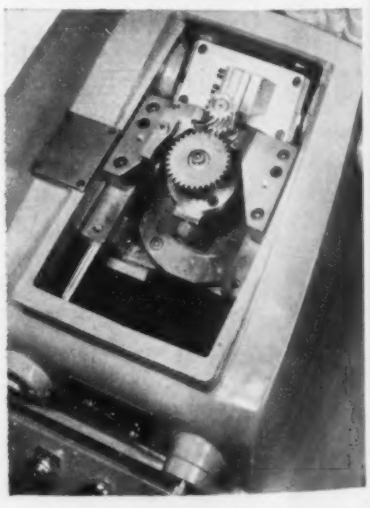
any unskilled operator and the required results will be realized.

Positive positioning of the precision-ground tool holder is assured since it nests and is keyed in two directions. Four socket-head screws hold the tool block in position and make mounting or dismounting a quick and simple task. The workholding fixture is located on the fixture-mounting rails and accurately positioned over hardened and ground dowels. It too is readily secured by four socket-head screws.

Clutch Prevents Damage

Machines are driven by a ½-hp motor, with two motors used on the two-station machines. The motor pulley is belt-connected to a second pulley, which in turn is belt-connected to a third pulley mounted on a spline cross shaft. A bevel gear on this shaft meshes with a second spline shaft which carries the sliding index worm that operates the index worm gear. The worm gear shaft carries the pilot gear. All ratios are 1:1 starting with the spline cross shaft up to the pilot gear.

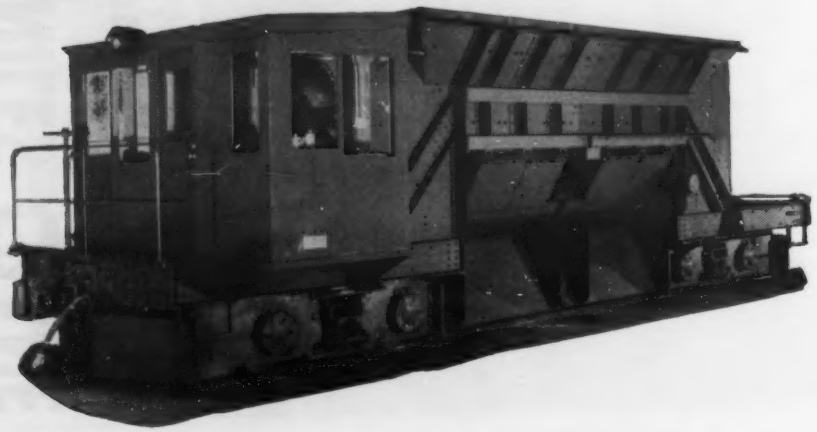
An over-riding clutch located in the final pulley hub prevents damage to the cutter or machine in the event of jamming for any reason. Once the jam is cleared, the machine resumes operation with the assurance of good production.



SAFETY COVER removed shows form cutter mounted on rocking tool block to provide cutting action when chamfering. Tooling can be changed in 10 minutes. Lead screw eliminates backlash between pilot gear and part when setting up machine.

FOR THE VERY BEST
See ATLAS

TRANSFERS - SCALE CARS
COAL CHARGERS - COKE QUENCHERS



50-TON GABLE BOTTOM ORE TRANSFER

Car is equipped with hydraulically operated discharge gates and brakes, and is provided with steel plate trucks. The operator's cab is overhung at one side to give the operator a line of vision alongside the car. The car is equipped with electric space heaters.

ENGINEERS AND MANUFACTURERS
THE ATLAS CAR & MFG. CO.
1100 IVANHOE ROAD • CLEVELAND 10, OHIO

The machines are completely en-
losed for safety. A safety cover,
part of the tooling for the particu-
ar gear being chamfered, elimi-
nates any possibility of operator
injury during loading or unload-
ng of parts. Two socket-head
screws hold the cover in place.

Lifetime Lubrication

All shafts, pulleys, etc., are
mounted in lifetime lubricated
anti-friction bearings. Index worm
nd gear, etc., run in a continuous
ath of oil in a sealed housing.
The only pressure lubricating fit-
ing is on the cam follower, and it
arely requires lubrication.

An electrical control panel at
the side of the machine contains
both the reve ing control and the
iming adjustment. Flipping the
elector switch shown reverses di-
rection of rotation of the index
gear. The timing cycle for a par-
ticular gear is adjusted by means
of a single screw located just
above the reversing switch.

MACHINING:

Tungsten carbide tooling speeds car wheel production.

Use of tungsten carbide tooling
has cut machining time for diesel
and car wheel sets to about 18
minutes, floor to floor, at the Citico
Wheel Shop of the Southern Rail-
way System, Chattanooga, Tenn.
Operations are handled with
Kennametal clamped tools on a
Niles 52-in. car wheel lathe equip-
ped with hydraulic feed and pro-
filing attachment. This rugged
100-hp lathe has double end chuck-
ing, drive, and tooling.

Use Insert Tools

Three clamped insert-tools are
used in each turret as shown in
accompanying photo of right-hand
turret: Tool No. 1 removes ex-
cessive mushroom or rollover on
outside of flange. Tool No. 2 re-
moves high portion of flange while
insert A of tool No. 3 is profiling
the tread. This insert profiles
from the outside radius across the
tread and up to top of the flange.
Inner side of flange is next ma-

Turn Page

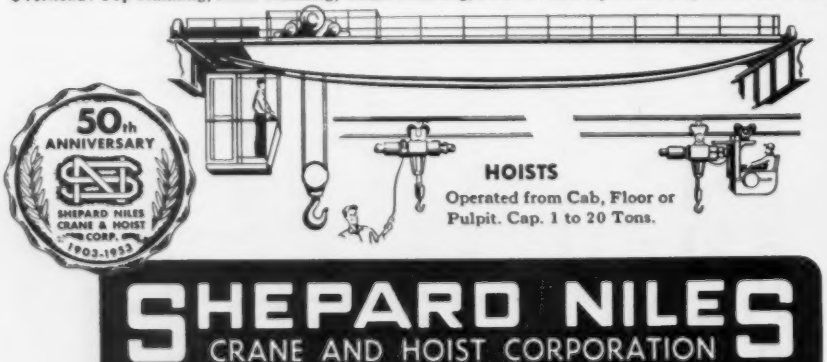
SHEPARD NILES CRANE

adds "Wings" to your work-in-process

Watch the way work speeds up when you install a Shepard Niles Crane in your plant! Why? Because through-the-air handling frees manpower for production—speeds the flow of materials—makes more floor space for men and machines. With a Shepard Niles Crane, you put unused ceilings to work—handle heaviest loads safely, easily, at low cost.

No doubt your plant would benefit from thrifty through-the-air handling. But which type of crane should you choose? Let the Shepard Niles representative help you in making this decision—he knows the importance of installing the right equipment from the start. Send for Bulletin describing Shepard Niles Cranes today—and arrange to have a representative stop by your office.

CRANES
Overhead: Top Running, Inner Running, Under Running, Floor or Cab Operated. Cap. 1 to 450 Tons.



50th ANNIVERSARY
SHEPARD NILES CRANE & HOIST CORP.
1903-1953

HOISTS
Operated from Cab, Floor or Pulpit. Cap. 1 to 20 Tons.

SHEPARD NILES
CRANE AND HOIST CORPORATION

1432 SCHUYLER AVENUE, MONTOUR FALLS, N.Y.

chined with insert B to complete the wheel.

Constant Feed

Cutting edge of tool No. 1 has 0.030 in. wide x 5° negative land. Tools Nos. 2 and 3 have parallel chip breakers ¼-in. wide x 0.020-0.025-in. deep. Before tools are put into service the operator hones the cutting edges to approximately a 0.005-in. radius.

Operation of each turret is independently controlled. The operator staggers the cutting period of each turret to minimize peak power load. Amount of power consumed is indicated on an ammeter. Longitudinal and cross movements are controlled hydraulically to maintain constant feed along the machined surface of the wheel.

For Uniform Wheel Size

Amount of stock removal is determined by a flange gage and by tape size of the wheel as specified by the American Association of Railroads. Left and right tracer styluses are then set with a measuring rod graduated in tape size to assure uniform wheel size after machining.

Freight and passenger car wheel sets of 33 and 36-in. diameters are machined at 0.082 to 0.086-in. feed, 12 rpm and 1/16 to ⅞-in. depth of cut (average ¼-in.). Profiling time is about 8 minutes for freight car wheels and 8 minutes for passenger car wheels.

DIESEL and car wheel sets are machined in 18 minutes floor to floor time using three carbide insert tools in each turret of double-end lathe. Lathe is equipped with hydraulic feed, profiling atttachment.

ANGULAR STANDARD:

National Bureau of Standards builds accurate polygon.

A 24-sided polygon of exceptional accuracy has been constructed by the National Bureau of Standards to serve as a basic standard of angular measurement.

Made of precisely machined and polished gage blocks accurately positioned at measured angular intervals on a circular base plate, the polygon permits the comparison of an "unknown" angle with consecutive angular intervals until the total of such intervals equals an integral number of perfect 360-degree angles.

The polygon was designed primarily for use in the calibration of the 15°, 30°, and 45° angle blocks of the master sets which industry uses to control the shape—and hence the interchangeability and proper functioning—of mechanical parts produced by mass production methods.

Industry May Use Method

The principle of the device is expected to find considerable application in the routine angular measurement work of the optical and mechanical industries.

Solid angular standards, or angle blocks, were developed during World War II as a result of the shortage of precise angular dividing equipment. They are hardened, ground, and lapped steel blocks about 3 in. long having specified angles between contact surfaces.

Like gage blocks, they may be combined with little error by wringing to form the sum or difference of a pair; thus, a series of 16 blocks can be mounted with a solid square to give any single subdivision of a circle to the nearest second.

For Larger Angles

Accuracy of the angle blocks used in this country is insured by NBS, which calibrates the master angle blocks with which manufacturers compare their working standards. In general, the angular values of a set of master angle blocks can be determined, using interfero-

Turn Page

INDEX OF ACP CHEMICALS FOR METAL PRESERVATION AND PAINT PROTECTION

METAL	OPERATION	ACP CHEMICAL
ALUMINUM	Cleaning	"DEOXIDINE" "DURIDINE" "ACP RIDOLINES AND RIDOSOLS"
	Preparation for Painting	"ALODINE" "DURIDINE" "DEOXIDINE"
	Protection from Corrosion	"ALODINE"
GALVANIZED IRON, ZINC, AND CADMIUM	Cleaning	"DURIDINE" "ACP RIDOLINES AND RIDOSOLS"
	Corrosion Proofing	"ZINODINE"
	Paint Bonding	"ZINODINE"
	Phosphate Coating, in Preparation for Painting	"LITHOFORM"
	Soldering Flux	"FLOSOL"
STEEL	Chromate Coating, in Preparation for Painting	"CROMODINE"
	Cleaning	"ACP RIDOLINES AND RIDOSOLS"
	Cleaning for Painting	"DEOXIDINE" "DURIDINE"
	Coating with Copper	"CUPRODINE"
	Drawing and Extrusion	"GRANODRAW"
	Paint Bonding	"CROMODINE" "DURIDINE" "GRANODINE" "PERMADINE" "THERMOIL-GRANODINE"
	Paint Stripping	"CAUSTIC SODA AND SOLVENT NO. 3"
	Phosphate Coating, in Preparation for Painting	"DURIDINE" "GRANODINE" "PERMADINE" "THERMOIL-GRANODINE"
	Phosphate Coating, to Protect Friction Surfaces	"THERMOIL-GRANODINE"
	Pickling with Inhibited Acids	"RODINE"
	Rust Prevention for Unpainted Iron	"PEROLINE"
	Rust Proofing	"PERMADINE" "THERMOIL-GRANODINE"
	Rust Removal—Brush, Dip, or Spray	"DEOXIDINE"
	Soldering Flux	"FLOSOL"

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CHEMICALS ACP PROCESSES

AMERICAN CHEMICAL PAINT COMPANY

GENERAL OFFICES: AMBLER, PENNSYLVANIA

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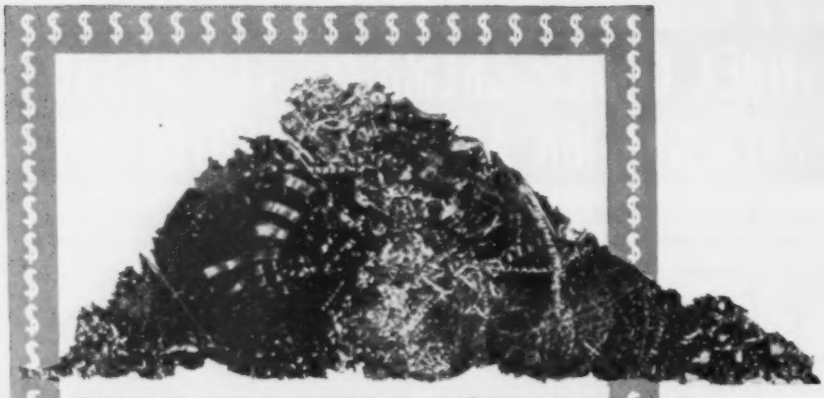


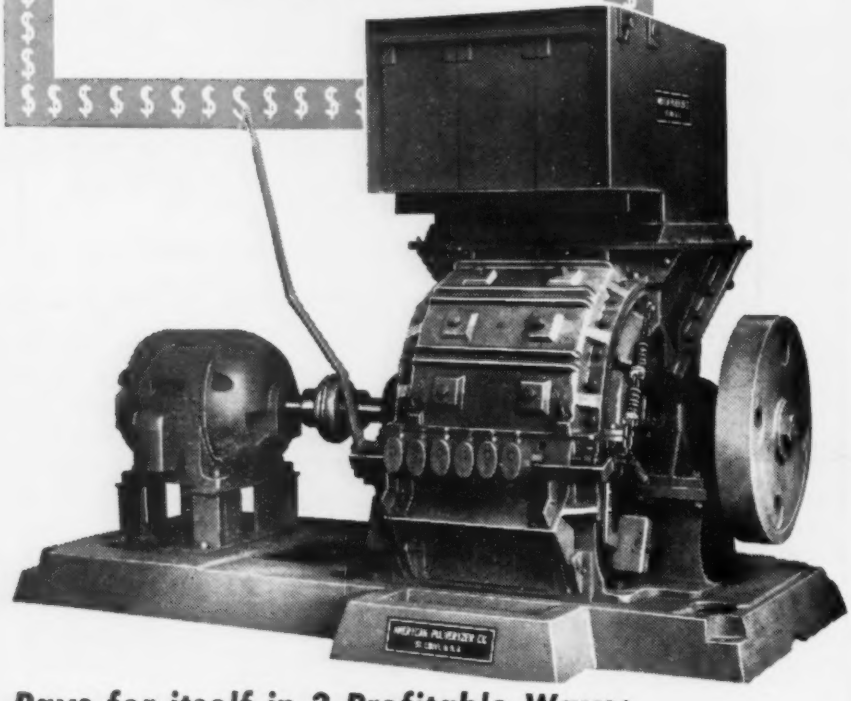
THERE ARE EXTRA DOLLARS IN THIS SCRAP PILE!

...when you install an

American

METAL TURNINGS

CRUSHER



Pays for itself in 3 Profitable Ways:

1. **TOP SCRAP VALUE.** Uniform short shoveling turnings produced by an American bring up to $4 per ton more than regular machine shop turnings.
2. **INCREASED CUTTING OIL RECOVERY.** Up to 50 gallons per ton are released from turnings reduced in an American.
3. **EASIER HANDLING, STORAGE.** American-reduced turnings require but a fraction of the usual storage space.. are easily briquetted.

Available in 1 to 10 tons per hour capacities to meet your needs. WRITE today for the complete American profit story.

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Originators and Manufacturers of Ring Crushers and Pulverizers

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metric methods of comparison, without reference to an external standard, but the necessary accuracy is difficult to obtain for the larger angles.

NBS therefore undertook to produce an angular standard that would permit direct calibration of 30° and 45° blocks. The 24-sided polygon that was constructed has 15° angles between adjacent faces and thus can be used to calibrate any multiple of this angle.

How Angles Are Measured

Calibration of an angle block by means of the polygon consists essentially in comparing the angle block with one or more angular intervals of the polygon. Angles are measured by sighting an autocollimator on the two faces which define an angle and then determining the angular difference between the two settings.

Each polished face acts as a plane mirror and a sharp image of the autocollimator cross hairs is formed. In practice, any error present in the calibration of the polygon is eliminated by comparing the angle block with a sufficient number of consecutive intervals to include an integral number of polygon rotations or circuits, that is to say, an integral number of perfect 360° angles. In this way it has been possible to determine the angles of master blocks with errors of approximately 0.1 second.

Flatness Important

The mechanical requirements for a standard polygon of the requisite accuracy for this type of work are quite rigorous. For example, the defining surfaces must be flat to one or two millionths of an inch over practically their entire area, the surface roughness of the faces must average less than 0.5 microinch, and the variations in the angle between the defining faces and the axis of the polygon must not be greater than 15 sec.

Construction of a solid polygon from a single piece of material to such limits constitutes a challenge to the best mechanical skill and equipment. It was therefore decided to assemble the polygon by

fastening gage blocks, which were already available with satisfactory defining faces, to a circular base plate in such a way that their outer faces would form the standard polygon. To keep the diameter of the plate within reasonable limits, the gage blocks were placed in two layers of twelve each.

How Blocks Were Finished

The circular base of the polygon is 0.75 in. thick and 8 in. in diameter. It was made of oil-hardened steel and heat-treated for maximum dimensional stability.

After hardening, the base was ground on both sides and then hand-lapped until the error in parallelism of the two surfaces was less than 0.0001 in. and maximum error in flatness of each surface was less than 0.00006 in.

Partial Wringing Possible

Modified 0.750-in. rectangular gage blocks were used for the defining faces. All four lapped sides were plane to 0.000005 in. or better, and adjacent sides were square to 2 sec of arc. The surface roughness of each of the sides was less than 1 microinch rms. This was reduced still further by polishing with a cloth lap.

The thickness (nominally 0.375 in.) of the 24 blocks in the group varied less than 0.00003 in. The bottom layer of blocks was so selected that adjacent blocks did not differ in thickness by more than 0.00001 in. This permitted at least partial wringing of the blocks in the upper layer to those in the lower layer and reduced distortion arising from the pressure of the clamping screws.

Build Better Deviation Meter

To provide more reliable and more sensitive receiving and recording instruments for communications signals, the National Bureau of Standards recently developed a simple frequency deviation meter.

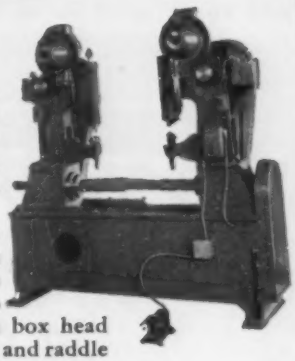
The new meter shows deviations of a signal from a reference frequency to better than 0.5 pct, NBS claims.

Turn Page

Speed Production.. Automatically with

T-J

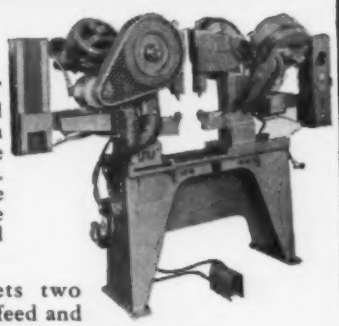
RIVITORS



T-J RIVITOR used for automotive clutch plate assembly. Saves time and labor doing a four-fold job—assembling, setting, inspecting and ejecting.

DOUBLE RIVITOR sets two rivets at a time! Equipped with 10″ hoppers, and tooled to automatically feed and set two ¼″ diam. x ⅝″ long wagon box head rivets at a time in elevator chain and raddle or elevator flight assemblies for farm implements. Controlled by one foot pedal.

CLINCHORS



T-J CLINCHOR . . one of six special 8″ throat Underfeed Clinchors used by a large automotive body manufacturer. Feeds and sets 11/16″ square cased nuts in outside quarter panels, left and right hand.

DOUBLE CLINCHOR sets two nuts at once! Tooled to feed and set ⅜″ x ½″ x 1/16″ thick Fabri-Steel nuts at each operation. Both Clinchors tripped by same foot-operated valve. Adaptable to wide range of clinch nut setting problems.

Boost production . . . save labor with T-J Rivitors and Clinchors for many assembly jobs today . . . in aircraft, automotive, farm machinery, stampings of all kinds.

T-J CLINCHORS set clinch nuts 3 to 5 times faster! Fully automatic . . . controlled by a single foot pedal! Available in Underfeed and Gravity feed models, throat depths 8″ to 36″.

T-J RIVITORS automatically feed and set solid rivets . . . with high production! Electrically-powered Rivitor sets 1/16″ to ¼″ diam. solid steel rivets up to ⅞″ long. Air-powered Rivitor sets aluminum alloy rivets up to ¼″ diam. or steel rivets up to ⅛″ diam. and up to ¾″ long. Throat depths 8″ to 36″.

Write for Clinchor bulletin 847; Rivitor bulletins 646 and 847. The Tomkins-Johnson Co., Jackson, Mich.

37 YEARS EXPERIENCE T-J

TOMKINS-JOHNSON

RIVITORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHORS

BLAST CLEANING:

Airless blast barrel can lower production cleaning costs.

Lower costs in production cleaning of smaller and larger castings and other metal parts are claimed for the airless type blast cleaning barrels developed by Pangborn Corp., Hagerstown, Md.

Pangborn recently added a 3 cu ft and an 18 cu ft to its line of Rotoblast barrels. The two new barrel sizes will include the eight construction features which have made the 6 and 12 cu ft sizes successful.

One of the most important of these features is an abrasive-tight door. This door is of all metal construction laminated with a rubber back to protect it from flying abrasive. Its side edges have rollers which travel in a mechanical labyrinth for door protection.

The door moves up and down like a window curtain, easily operated by a crank which winds or unwinds the roller. It is held in any position by a ratchet and brake on the roller. Another feature is a heavy rubber curtain located between the door and the area in which the blasting takes place.

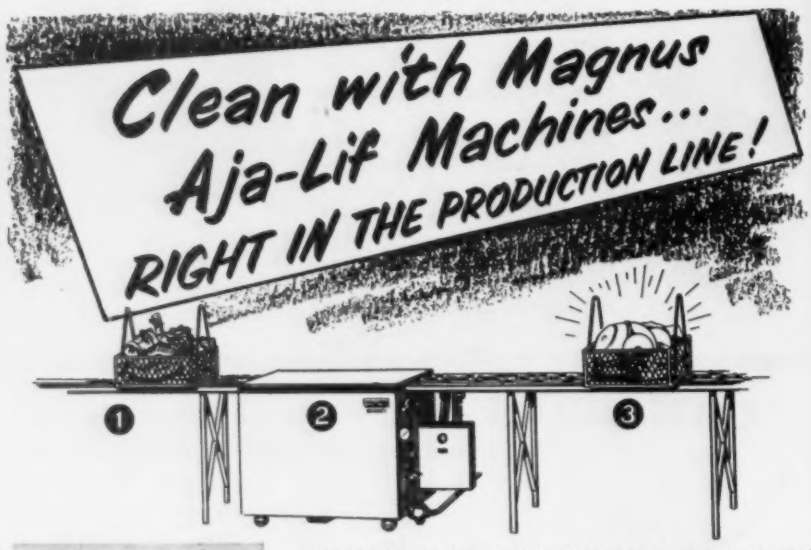
This curtain protects the door from flying abrasive and prevents castings from damaging the door. One end of the curtain is attached to the door and the other end to the roof deck. The curtain rolls up and down with the door, weighted by a free metal roller which holds it in position while blasting is taking place.

Protection Against Jams

Power for the work conveyor drive is supplied from a separate motor through V-belts to a spur type reducer mounted directly on the work conveyor top shaft—much more efficient than the usual worm arrangement. Anti-friction roller bearings have been used at all points where shafts must carry loads. The result is smooth performance and lower operating costs and also longer life for vital moving parts.

A non-pinch work conveyor consists of a continuous hardened

LOWER COSTS with high cleaning efficiency have been attained in cleaning parts in the airless Rotoblast barrel, it is claimed.



AJA-LIF IN PRODUCTION LINE. Work is loaded and unloaded at top of machine. 1—Dirty parts from processing; 2—Cleaning in Aja-Lif; 3—Cleaned parts to finishing.

Magnus Aja-Lif Cleaning Machines bring you all the advantages of speed and thoroughness of the Magnus Aja-Dip principle of metal cleaning. Added to the chemical action of the cleaning solution is the vigorous and effective mechanical scouring and shearing action obtained while the work is moved up and down in the solution 90-180 times a minute.

***In addition,* with the Aja-Lif Machine, you load the work on the machine at waist level. When you press the starting button, the platform drops as the cover closes, and agitation starts. When ready to unload, the machine stops and the platform returns to waist level. The machine fits perfectly into the production line!**

COMPRESSED AIR OPERATED . . . no gears, speed reducers or belts. No motors or electrical connections. Heating source to meet your needs.

WRITE FOR BULLETIN AL-701, containing the complete story on this unique metal cleaning machine.

magnus

MAGNUS CHEMICAL CO., INC.
46 South Avenue, Garwood, N. J.
In Canada—Magnus Chemicals, Ltd., Montreal
Service Representatives in Principal Cities

steel roller chain with heavy metal slats. The slats are designed so that at no time is any opening presented to pinch the work or clog. Individual perforated slats are easily replaced as they wear, and the entire assembly can be easily removed from the machine. Drum ends are free turning on large-size Timken roller bearings packed with grease and perfectly sealed. The conveyor take-up is located at the bottom of the work conveyor. Unobstructed bolt-head screw provides ready access for wrench, makes take-up operation easy and quick. Controls are centralized.

May Be Rapidly Loaded

During operation, the cleaning and reclaiming system is constantly at work removing all sand and debris and maintaining the full efficiency of the abrasive.

A quick-acting work loader, with double cables for safety, positively delivers the entire load into the machine. The work goes into the machine with the least possible drop, reducing casting breakage, but the discharge angle is such that even flat pieces of work will not hang up on the loader or require special attention from the operator.

MAINTENANCE:

Sulphated battery problem can be spotted and cured.

A "sulphated" battery is one which has been undercharged to the point where abnormal lead sulphate has formed on the plates. When this occurs the chemical reactions within the battery are impeded and loss of capacity and complete failure may result.

What to Look For

Gould-National Batteries, Inc. suggests an eleven point program to "cure" a sulphated battery plus six causes of sulphation which should be avoided. It is important to detect a "sulphated" battery as soon as possible. The sooner treatment is started, the less the damage from sulphation will be and the earlier the battery can be returned to service.

Here's how you can diagnose a sulphated condition. All cells of a sulphated battery will give low specific gravity and voltage readings. An internal inspection will disclose negative plates having a slate-like feeling, sulphated negative-plate material being hard and gritty and having a sandy feeling when rubbed between thumb and forefinger.

Internal inspection should be made after a normal charge since a discharged plate is always somewhat sulphated. A normal fully charged negative plate is spongy and springy to the touch and gives a metallic sheen when stroked with the fingernail or a knife. A sulphated positive plate is a lighter brown color than the normal plate.

When a battery is charged re-

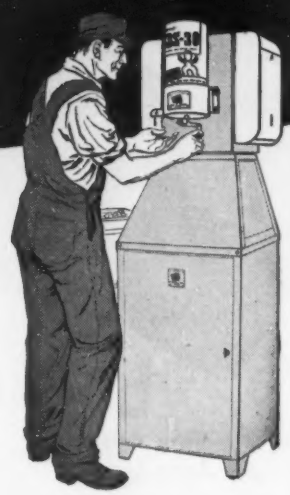
Turn Page

NEW SBS WATERLESS WASHSTATION*

"brings the washroom to the worker"*

for only $52.50 per unit

(F.O.B. Saginaw, Mich. Towel Dispensers not included)



SBS Waterless Washstations are complete units for hand washing on the job. Because they dispense SBS-30 Waterless Skin Cleanser, these Washstations require no plumbing . . . SBS-30 is simply rubbed on the hands and wiped off along with all the soil.

SBS Waterless Washstations—

- **In Trouble Spots** — Avoids workers use of irritating, harmful solvents. Quickly and safely removes tars, greases, paints, varnishes and other hard-to-remove soils.
- **On the Production Line** — Cuts to a minimum costly interruptions for hand washing.
- **Actually Earn You Money** — By eliminating one unnecessary trip per day for hand washing by only 10 men, you can save up to $720 annually.

Fill out and mail coupon below for complete information about SBS Waterless Washstations and our 30-day no-risk money back trial offer.

SUGAR BEET PRODUCTS CO. • Saginaw, Mich.
Chemical By-Products Division

MAIL TODAY - GET THE FACTS!

SUGAR BEET PRODUCTS CO., Dept. BA, SAGINAW, MICHIGAN

Sirs: Please send me full information about the new SBS Waterless Washstation and your 30 day no-risk money back trial offer.

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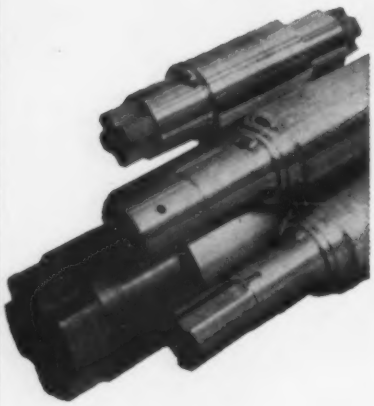
RED CIRCLE Rolls ALLOY-CHILLED

Red Circle Rolls for all Purposes

Hyde Park Red Circle Rolls are outstanding in quality and in performance and are easily identified by the Red Circle.



for
finer finish
long life
greater tonnage
Specify Red Circle

Chilled Rolls
Alloy Iron Rolls
Moly Rolls
Nickel Chilled Rolls
Grain Rolls
Cold Rolls
Sand Rolls

Hyde Park
FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland County, Pa.
ROLLS
ROLLING MILL MACHINERY
GREY IRON CASTINGS

peatedly at low rates the acid is not effectively driven out of the plates, particularly the lower parts, and sulphation results. Repeated partial charges, stopping before there has been sufficient gassing to effect a thorough mixing of the electrolyte, results in sulphation.

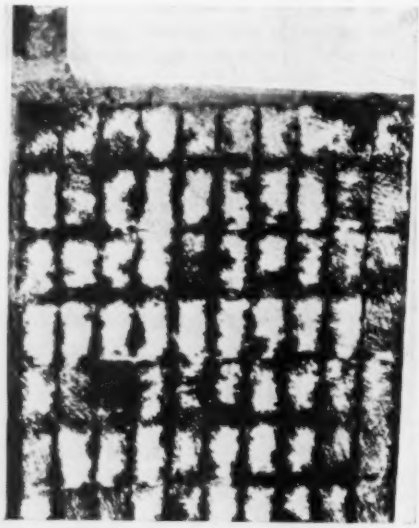
It is difficult in normal battery operation to determine just when sulphation begins, and only by giving periodic equalizing charges and comparing individual cell specific gravity and voltage readings can it be detected in its early stages and corrected or prevented.

Keep Pores Open

Permitting a battery to stand in a partially discharged condition allows the sulphate deposited on the plates to harden and the pores to close. Batteries should be charged as soon as practicable after discharge and not allowed to stand in a completely discharged condition for more than 24 hours.

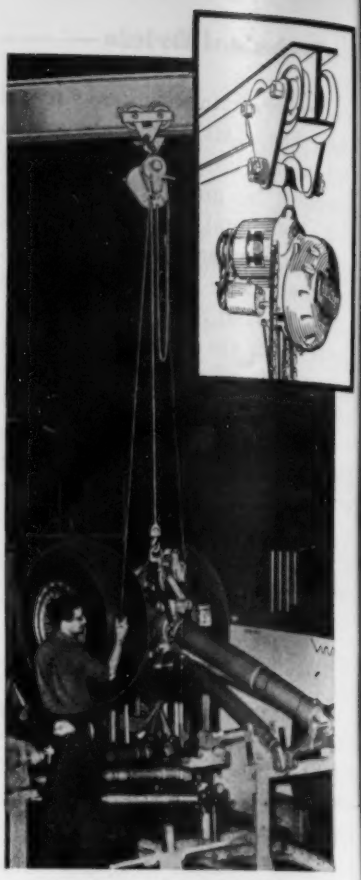
If the level of the electrolyte is permitted to fall below the tops of the plates, the exposed surfaces will harden and become sulphated. If acid is added to a cell in which sulphation exists, the condition will be aggravated.

In general, the higher the fully charged specific gravity of a cell, the more likely is sulphation to occur.



ABNORMAL formation of lead sulphate on battery plates results from undercharging. Proper maintenance and care can help reduce this problem.

Turn Page



GIVE OUTPUT A BOOST!

Help manpower do more. Let the speed and efficiency of the 'Budgit' Electric Hoist step up defense and civilian production. The ¼-ton size lifts the full load a foot in less than two seconds. All it takes to start this fast lifting action is a slight pull on the control cord with one hand. No muscle strain. Hoisting is easy, safe. A 'Budgit' Hoist lifts all day for a few pennies' worth of current.

The 'Budgit' Hoist is a complete, portable load-handling unit. No extras to buy. Just hang up, plug in, use! Capacities: 250 to 4,000 lbs., A.C. and D.C. models. Prices start at $129. Bulletin 391 on request.

A 'BUDGIT' I-BEAM TROLLEY makes any hoist more useful. Tough steel construction. Ball bearings in wheels. Adjustable to fit several sizes of I-beams. Capacities: 500 to 4,000 lbs. Priced from $15.50. Write for Bulletin 390.

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MANNING, MAXWELL & MOORE, INC.
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Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' Industrial Instruments.

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No. 84
VERTICAL PLATE LIFTING CLAMP
This universally used plate lifting clamp has built its reputation through tough and dependable service. It is designed for jobs where safety and sureness really count. Plates can be lifted to or from horizontal.

No. 92
HORIZONTAL PLATE CLAMPS
These clamps are sturdily constructed so as to handle sheet or plate singly or in layers.

No. 119
PLATE HOOKS
Excellent lightweight hook for lifting plate, beams, structurals, pipe, etc.

No. 85
SET SCREW PLATE GRIPS
This grip maintains a locked hold on plates at all times. Ideal for positioning plates while fabricating.

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BEAM TONGS
Crate, pipe, rail, timber, beam tongs and other tongs, hooks, barrel and drum lifts, etc. manufactured to satisfy a multitude of material handling problems.

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—Technical Briefs—

HEAT TREATING:

Ryan installs big furnace for handling aluminum.

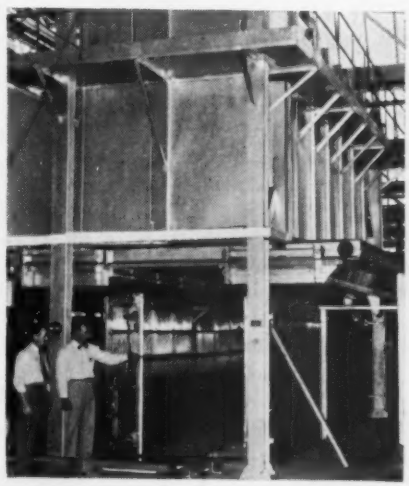
Another roof-raising furnace has been installed at Ryan. Towering more than 25 ft high, the new heat treating facility is a modern type of "quick-quench" furnace which can douse hot parts into cold water within a six-second interval.

Designed by the James Knapp Co., Los Angeles, the unusual furnace is an elevated electric model which is charged from below. In this respect it is similar to the big General Electric Furnace which Ryan uses to stress relieve stainless steel jet engine components. The Knapp furnace is designed for heat treating aluminum alloys and utilizes a 13,000-gal water tank for fast quench-cooling.

Capacity Expanded

With the massive new unit Ryan has greatly expanded capacity for heat treating these alloys, previously confined to molten salt bath processes. This increase is in conformity with the enlarged production of aft fuselages which Ryan builds for Boeing C-97 Stratofreighter aircraft.

The heat treatment will be employed to render the alloys ductile for forming purposes. These aluminum alloys have the property of hardening with age after heat treatment.



SPRAY BAR IS USED for spray cooling of parts beneath Ryan's new Knapp-Lee quick-quench furnace.

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for sound, clean welds!

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Through the development of special cold forming equipment and methods, Weiger-Weed produces offset welding electrodes with these important advantages: . . .

- No loss of physical or electrical properties—cold formed offset tips have the same hardness and conductivity as straight tips.
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- Economy, quick delivery—most styles are formed quickly from standard straight tips.

Many other special cold formed electrodes to lick difficult clearance problems can be worked out by WW if quantities warrant the tooling. Give us the details of your problem.

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Windpipe for a peaceful H-bomb

You can call it an H-bomb if you like. Some people do. Technically, it *is* a hydrogenation bomb or, simply, a super-pressure vessel. Uses for it are legion but not warlike.

Researchers in rubber, plastics, pharmaceuticals, petroleum, and solvents pilot their hydrogenation, oxo-reaction, polymerization and other jaw-breaker problems in its gizzard—under high pressure.

To speed-up chemical reactions, the vessel is rocked 38 times a minute. Pressurizing a see-sawing chamber is in itself a neat trick: when pressures of the order of 60,000 p.s.i. are required you might become discouraged or concerned.

American Instrument Company, Inc., maker of Super-pressure equipment, introduces the pressure through a spiral windpipe. They had some trouble through tube breakage but that was before they tried Superior 304 Cold-drawn Seamless Stainless Steel Tubing. Superior gives them just the flexibility and fatigue strength needed for cyclic operation, plus chemical resistance and burst pressure to spare. Spirals of Superior 304 are easier to bend, last longer. And American Instrument reports them dimensionally uniform, smooth and free from surface imperfections.

If you haven't found small tubing in the analysis, size, and finish you want, or if you think there's little difference in tubing or tubing experience, Superior invites your inquiry. Superior Tube Company, 2004 Germantown Avenue, Norristown, Pennsylvania.

Round and Shaped Tubing available in Carbon, Alloy, and Stainless Steels; Nickel and Nickel Alloys; Titanium, Zirconium, and Beryllium Copper

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All analyses .010" to ⅝" O.D.
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THE IRON AGE SUMMARY . . .

- **Steel consumers will usher in freight absorption**
- **Freight rates higher, restrict mill competition**
- **Scrap iron, steel market continues headlong slump**

Cost-conscious steel users are now chafing under the burden of extra freight charges for steel delivered from out-of-area mills. When supply-demand scales tip in favor of supply, steel plants must either absorb freight or retreat from some of their distant markets.

Because of tall increases in shipping rates, freight absorption by the steel industry will never regain its traditional status as the great price equalizer. This is one of the significant phases of the steel market's transition from shortage to plenty

Consumer pressure to obliterate extra freight charges will heighten in the fourth quarter and run into 1954 as steel supply eases further. It could force a considerable reshuffling of supply lines.

Up to now, the steel consumer gratefully paid extra freight charges to get needed steel. His willingness to do so is ebbing, will soon be non-existent. Steelmakers' entry into intensifying competition will leave them the dismal choice of losing some distant markets or absorbing freight to keep modern, costly facilities from slowing their pace.

What will seriously inhibit this type of steel competition and make mills pause to reconsider before reaching out of territory are substantial rises in freight rates in the past 10 years. A distant market that years ago meant $5-a-ton freight absorption to a mill now may cost it $15—too much for the profits sheet to withstand. Only a drastic, unlikely, slump in the steel market could force mills into cutthroat freight absorption.

IRON AGE was told that some important mills will continue the trend to snub faraway markets except on a selective basis. On a few products some mills have recently withdrawn from some markets. One producer dropped its cold-finished bar business with a large user rather than absorb freight. Other users quickly absorbed released tonnage, but mills may want to woo some markets back when bar supply is more abundant.

Current freight absorption is largely confined to producers of stainless steel and some wire products. The trend is spreading to mechanical tubing and some alloy products. Carbon and reinforcing bar freight is now being absorbed in Chicago.

Meanwhile, the steel market holds its course of gradual easing. There are absolutely no signs of panic and demand for the many steel products continues strong—although not urgent.

Conversion in the Chicago area is almost totally dead. Merchant steel products took a turn for the worse and one mill for the first time in years, stocked 3000 tons to be able to provide immediate delivery.

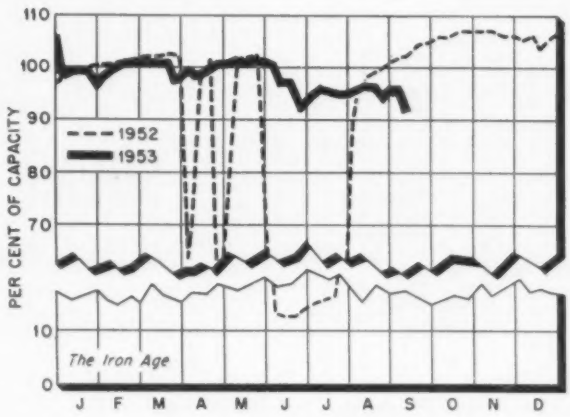
In the Detroit area alloy bars were rapidly easing, mainly because of low truck output, military cutbacks, and return of manufacturers to carbon bars. Most steel producers paid overtime on Labor Day to keep up high melting operations.

With steel plant buyers holding back, the scrap iron and steel market continued its headlong slump. THE IRON AGE No. 1 Heavy Melting Scrap Composite dropped $1.33 from last week's $40.00.

Steel Operating Rates

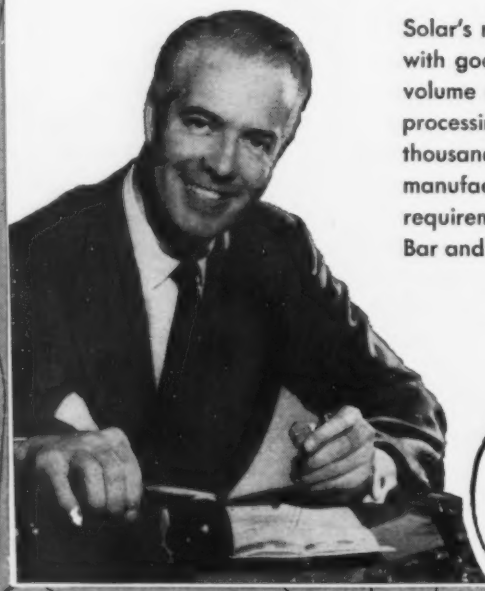
	Week of Sept. 6	Week of Aug. 30		Week of Sept. 6	Week of Aug. 30
Pittsburgh	95.0	96.0*	Detroit	102.0	104.0*
Chicago	99.0	101.0	Birmingham	99.5	97.0
Philadelphia	96.5	97.5	Wheeling	96.0	97.0*
Valley	96.0	94.0*	S. Ohio River	85.0	80.0
West	95.0	98.5*	St. Louis	94.0	94.0
Cleveland	95.5	97.0*	East	75.0	79.0
Buffalo	71.5	106.5	AGGREGATE	92.5	95.5

Beginning Jan. 1, 1953, operations are based on annual capacity of 117,522,470 net tons.
* Revised.



"I CALLED Solar...

and believe me, it was worthwhile because Solar's prices for my material, ready for production, saved us money!"



Solar's nine production warehouses with good inventories and large daily volume on modern, high speed processing equipment, are saving thousands of large and small manufacturers money, on their requirements for Flat Rolled and Bar and Tube Products.

call a Solar Sales Office today—

Turn your purchase orders into increased profits.

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Markets at a Glance

Plan Plant . . . White Motor Co. will soon begin construction of a $2 million dollar plant at Exton, Pa., to modernize and expand its recently acquired Autocar Div. New development will replace existing facilities at Ardmore, Pa. Exton plant, which is scheduled for occupancy in early 1954, will give White at least 130,000 sq ft of additional manufacturing facilities. Top level Autocar personnel will remain in charge when the new plant gets into production.

Repair Fire Damage . . . Continental Gin Company, Birmingham, this week began work on a $1 million contract calling for rebuilding and replacing more than 50 huge lathes badly damaged in the multi-million dollar General Motors Corp. fire. Those too badly damaged will be replaced with new ones. Continental Gin also was given an additional half-million dollar order for 40 new lathes. More than 250 of the machines used in the General Motors plant were manufactured by Continental Gin Co.

A New High . . . Business in the Pittsburgh district reached a new high level for 1953 in the week ended Aug. 29. University of Pittsburgh's Bureau of Business Research says the business index rose to 210.5 pct of the 1935-39 average, compared with 191.8 a month ago and 205.4 at end of June. Trade slowup was less than seasonal, industrial production and freight shipments were up slightly.

Oil Consumption . . . Daily consumption and export of domestic crude petroleum for September will be 6,470,000 bbl, U. S. Bureau of Mines estimates. The forecast includes estimates of a total gasoline demand of 110.0 million bbl during the month, a gasoline yield of 44.8 pct, and total crude runs of 7,050,000 bbl daily. If crude runs continue at the current rate throughout the month total refined stocks on Sept. 30 may be as high as 448 million bbl or 39 million bbl over September 1952.

Scrap Market Sinks . . . Steady decline of the scrap iron and steel market continued this week as steel mill buyers stayed away from the marketplace in droves. There was talk that the market was shaking down to lower price levels. THE IRON AGE No. 1 Heavy Melting Scrap Composite dropped again—this time to $38.67, off $1.33 from last week.

Alloy Softens . . . Although the alloy steel market is softening, one large producer points out that it still is running some electric furnaces that were in standby condition before Korea. This market may be slipping but it will definitely not be crippled.

Cancelled Steel . . . Midwest steel producers report a steady but still negligible stream of small order cancellations. Some automotive industry cancellations (GM fire) have been snapped up by other users, especially cold-rolled sheet and carbon bars. Warehouses are continuing their drive to get steel. Inventories are now considered good.

Mill Prices Clipped . . . All major producers of brass and copper mill products cut their prices last week to reflect the 30¢ copper price. Earlier quotations were based on an average of U. S. and Chilean copper prices. Some sample price cuts are: Copper sheet, now 46.41¢, was 48.51¢; yellow brass rods, now 41.66¢, was 42.56¢; manganese bronze extrusions, now 45.18¢, was 46.18¢.

Cancels Trip . . . U. S. negotiators were all set to start dickering with Chile for that nation's surplus copper stocks. But Luis MacKenna, counsel of the Chilean Central Bank, who was in Santiago discussing the U. S. offer, is now reported to have postponed his return trip to Washington. No reason was offered. It is now estimated that the Chilean stocks have grown to about 100,000 tons.

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Last Week	Month Ago	Year Ago
Composite Prices				
Finished Steel, base	4.634	4.634	4.634	4.376
Pig Iron (gross ton)	$56.76	$56.76	$56.76	$55.26
Scrap, No. 1 hvy. (gross ton)	$38.67	$40.00	$44.42	$42.00
Nonferrous Metals				
Aluminum, ingot	21.50	21.50	21.50	20.00
Copper, electrolytic	29.50	29.50	29.25	24.50
Lead, St. Louis	13.80	13.80	13.80	15.80
Magnesium, ingot	27.00	27.00	27.00	24.50
Nickel, electrolytic	63.08	63.08	63.08	59.58
Tin, Straits, N. Y.	82.75	83.50	78.50	$1.21⅜
Zinc, E. St. Louis	10.50	11.00	11.00	14.00

Trim Brass, Copper Mill Prices

New mill levels lower, based on 30¢ copper . . . Chile clears way to selling copper to "anyone" . . . Zinc price cut to 10½¢ per lb . . . Absorb freight over ½¢—By *R. L. Hatschek.*

New price levels for copper and brass mill products were put into effect last week. Quotations now reflect copper at 30¢ per lb as well as current prices for zinc, lead and other alloying agents. You will recall that the previous higher quotations were based on the average of domestic and Chilean copper prices. New prices are tabulated on page 220.

The brass mills also cut scrap buying quotations to a basis of 26¢ per lb for heavy copper and 25¼¢ per lb for copper turnings. At the same time custom smelters and ingot makers edged their buying prices up a shade while dealer prices remained at previous levels.

Chile Gets Set . . . Reports last week indicated that President Carlos Ibanez of Chile had signed a decree freeing copper or other strategic materials for export anywhere in the world. In the light of earlier statements this move is a natural follow-through.

But it doesn't necessarily mean that Chile will sell its surplus copper to the Russians. The Chilean government has stated it would take such action only after negotiations with the U. S. had been concluded. They hadn't started as this went to press, though an offer of undisclosed nature was made by the State Dept. for Chile's copper.

Red Rumors Fly . . . One Chilean newspaper has reported that a Russian trade mission, currently in Argentina, had made overtures through the Argentine Embassy for purchase of 20,000 tons of copper. Knowledge of this was denied by all available Chilean representatives.

Meanwhile, the domestic market continues to straggle along with unchanged prices, though most sales now being made are on a price at date of shipment basis.

Zinc Price Trimmed . . . Another price action that took place last week was the cutting of ½¢ per lb from the zinc quotation. New level is 10½¢ per lb f.o.b. East St. Louis. Initial move was made by American Smelting & Refining Co. but it was quickly followed by others.

AS&R stated at the same time that it will charge freight to the buyer. This charge, however, is not to exceed ½¢ per lb in any case.

The price cut brought some action from generally apathetic consumers but they seem to be in no great hurry to jump into the market. London prices also eased somewhat in sympathy with the new U. S. level.

Lead Quiets . . . Quotations for lead continued unchanged despite an almost 50 pct drop in trading following the zinc price cut. It is doubted that this will last or that any price cuts will result despite a dip in the London Exchange.

Oops, Slipped . . . Office of Defense Mobilization was forced to backtrack on its statement that civilian aluminum consumers would have "appreciably more" metal available in the fourth quarter. A rash of controversy broke out in which ODM's prediction was disputed in loud tones.

The corrected statement said civilians could expect 2 to 3 pct more aluminum and perhaps as high as a 6 pct increase over previous quarters. The maximum is based on increasing imports of the light metal and both primary and secondary aluminum are included in the figures.

National Production Authority questioned the wisdom of increasing the aluminum stockpiling rate to the record level indicated by ODM (See THE IRON AGE, Sept. 3, p. 160.) Fourth quarter setaside of aluminum for military and atomic energy uses has been pegged at 117,500 tons, a drop of 12,500 tons from the third quarter.

Output Drops . . . Total production of primary magnesium ingot in June dropped to another low point at 7286 tons. This compares with 9116 tons in May, a decline of about 32 pct, and reflects the reduced output of five government-owned plants that are now completely shut down. Production still exceeds consumption by a wide margin.

Shipments of wrought magnesium products in June totaled 581 tons, a terrific decline from the preceding month's 849 tons. This is largely due to variation in time lag as semi-finished products are shipped between plants, according to Magnesium Assn. Casting shipments were boosted from 1339 tons in May to 1568 tons in June.

NONFERROUS METAL PRICES

(Cents per lb except as noted)

	Sept. 2	Sept. 3	Sept. 4	Sept. 5	Sept. 7	Sept. 8
Copper, electro, Conn.	29.00–30.00	29.00–30.00	29.00–30.00	29.00–30.00	....	29.00–30.00
Copper, Lake delivered	30.125	30.125	30.125	30.125	....	30.125
Tin, Straits, New York	83.75	82.75	82.75	....	....	82.75*
Zinc, East St. Louis	10.50	10.50	10.50	10.50	....	10.50
Lead, St. Louis	13.80	13.80	13.80	13.80	....	13.80

Note: Quotations are going prices
*Tentative

CORROSION which protects rather than destroys

THE RUST-PROOFING of iron and steel products is a "sacrificial" function of metallic zinc which for many years has accounted for the metal's largest single use. Nearly 50% of all the zinc consumed in the United States is used for galvanizing. This "sacrificial" characteristic of zinc in providing iron and steel with low-cost protection against rust is also responsible for the increasing use of the metal in the form of anodes for the cathodic protection of pipe lines and other underground iron and steel structures. The property of zinc which makes this possible is due to the metal's advantageous position in the electromotive series. As indicated by the listing on the right, zinc – of the commonly available metals – stands far enough below iron so that its electronegative potential provides effective and economical cathodic protection, but not so far as to sacrifice itself needlessly in doing its job.

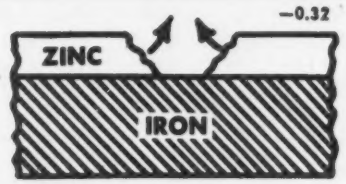
ELECTROMOTIVE SERIES of the COMMON METALS*

Vs. H_2		Vs. Iron
+1.36	Gold	+1.80
+0.86	Platinum	+1.30
+0.798	Silver	+1.23
+0.344	Copper	+0.78
0.000	HYDROGEN	+0.44
−0.12	Lead	+0.32
−0.14	Tin	+0.30
−0.23	Nickel	+0.21
−0.40	Cadmium	+0.04
−0.44	IRON	0.000
−0.56	Chromium	−0.12
−0.762	Zinc	−0.32
−1.33	Aluminum	−0.89
−1.55	Magnesium	−1.11

**U. R. Evans, "Metallic Corrosion, Passivity & Protection"*

Rusting is an electrochemical action in which iron replaces hydrogen, or a metal, in an electrolyte. Each metal has its own definite activity in this respect, which is termed its electro-potential. A list of the metals arranged in increasing order of activity, with their electro-potential expressed in volts is called the Electromotive Series. For convenience – at the right hand side of the above table – the zero point has been placed at iron and the figures, since they are relative only, have been transposed to show the metals' activity relative to iron.

I. Tin, electro-positive to iron, has no protective action.



II & IIa. Zinc, electro-negative to iron, with a driving voltage of 0.5 volt more than iron in soil or water, provides efficient protective action through sacrificial corrosion.

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Nonferrous Prices

(Effective Sept. 8, 1953)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.136-in. and thicker, 2S, 3S, 33.9¢; 4S, 36.0¢; 52S, 38.2¢; 24S-O, 24S-OAL, 37.0¢; 75S-O, 75S-OAL, 44.7¢. 0.081-in., 2S, 3S, 35.1¢; 4S, 37.7¢; 52S, 39.9¢; 24S-O, 24S-OAL, 38.4¢; 75S-O, 75S-OAL, 46.9¢. 0.032-in. 2S, 3S, 37.0¢; 4S, 41.8¢; 24S-O, 24S-OAL, 46.9¢; 75S-O, 75S-OAL, 58.4¢.

Plate, ¼-in. and Heavier: 2S-F, 3S-F, 32.4¢; 4S-F, 34.5¢; 52S-F, 36.2¢; 61S-O, 35.6¢; 24S-O, 24S-OAL, 36.9¢; 75S-O, 75S-OAL, 44.3¢.

Extruded Solid Shapes: Shape factors 1 to 5, 37.4¢ to 82.8¢; 12 to 14, 38.2¢ to 99.0¢; 24 to 26, 40.9¢ to $1.29; 36 to 38, 48.4¢ to $1.89.

Rod, Rolled: 1.064 to 4.5-in., 2S-F, 3S-F, 43.8¢ to 37.2¢; cold-finished, 0.375 to 3.499-in., 2S-F, 3S-F, 47.6¢ to 39.3¢.

Screw Machine Stock: Rounds, 11S-T3, ½ to 11/32-in., 59.6¢ to 47.0¢; ⅜ to 1½-in., 46.6¢ to 43.8¢; 1 9/16 to 3-in., 42.7¢ to 39.9¢. Base 5000 lb.

Drawn Wire: Coiled 0.051 to 0.374-in., 2S, 44.1¢ to 32.4¢; 52S, 53.4¢ to 39.1¢; 17S-T4, 60.1¢ to 41.8¢; 61S-T4, 53.9¢ to 41.3¢.

Extruded Tubing: Rounds, 63S-T5, OD 1¼ to 2-in., 41.6¢ to 60.7¢; 2 to 4 in., 37.7¢ to 51.1¢; 4 to 6 in., 38.2¢ to 46.6¢; 6 to 9 in., 38.7¢ to 48.8¢.

Roofing Sheet: Flat, per sheet, 0.032-in., 42¾ x 60 in., $2.838; x 96 in., $4.543; x 120 in., $5.680; x 144 in., $6.816. Coiled sheet, per lb, 0.019 in. x 28 in.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 66¢; 3/16 in., 68¢; ½ in., 70¢; B & S Gage 10, 71¢; 12, 75¢. Specifications grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 77¢; ½ to ¾ in., 60.5¢; 1¼ to 1.749 in., 56¢; 2½ to 5 in., 51.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.3¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD, ¼ to 5/16 in., $1.43; 5/16 to ⅜ in., $1.29; ½ to ⅝ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall: OD, ⅝ to ¾ in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(100,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	86½	67½	92½
Strip, CR	92½	70½	98½
Rod, bar	82½	65½	88½
Angles, HR	82½	65½	88½
Plate, HR	84½	66½	90½
Seamless Tube	115½	100½	137½
Shot, blocks	....	60	....

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	46.41	....	48.48
Copper, h-r	48.38	44.73	....
Copper, drawn	....	45.98	....
Low brass	44.47	44.41	....
Yellow brass	41.72	41.66	....
Red brass	45.44	45.38	....
Naval brass	45.76	40.07	41.33
Leaded brass	....	....	39.11
Com. bronze	46.95	46.89	....
Mang. bronze	49.48	43.62	45.18
Phos. bronze	66.58	67.08	....
Muntz metal	43.96	39.77	41.02
Ni silver, 10 pct	55.36	....	62.63

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	21.50
Aluminum pig	20.00
Antimony, American, Laredo, Tex.	34.50
Beryllium copper, per lb conta'd Be.	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	29.00 to 30.00
Copper, Lake, delivered	30.125
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$165 to $175
Lead, St. Louis	13.80
Lead, New York	14.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	27.00
Magnesium, sticks, 100 to 500 lb.	45.00 to 47.00
Mercury, dollars per 76-lb. flask, f.o.b. New York	$188 to $191
Nickel electro, f.o.b. N. Y. warehouse	63.08
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel	56.25
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$93.00
Silver, New York, cents per oz.	85.25
Tin, New York	82.75
Titanium, sponge	$5.00
Zinc, East St. Louis	10.50
Zinc, New York	11.00
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	24.50
No. 120	23.75
No. 123	23.25
80-10-10 ingot	
No. 305	28.75
No. 315	26.50
88-10-2 ingot	
No. 210	37.50
No. 215	34.00
No. 245	29.50
Yellow ingot	
No. 405	20.75
Manganese bronze	
No. 421	25.25

Aluminum Ingot

(Cents per lb del'd, 300,000 lb and over)

95-5 luminum-silicon alloys	
0.30 copper, max.	24.50-25.00
0.60 copper, max.	24.00-24.75
Piston alloys (No. 122 type)	22.50-23.00
No. 12 alum. (No. 2 grade)	21.75-22.50
108 alloy	22.50-23.00
195 alloy	22.50-24.00
13 alloy (0.60 copper max.)	24.00-24.75
ASX-679	22.50-22.75

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	23.75-24.00
Grade 2—92-95%	22.50-23.00
Grade 3—90-92%	21.50-22.00
Grade 4—85-90%	20.50-21.00

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	44.54
Electrodeposited	38.38
Flat rolled	47.14
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	85.00
Rolled, depolarized	86.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	94⅛

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63.90
Copper sulfate, 99.5 crystals, bbl	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	30.00
Nickel chloride, 375 lb drum	38.00
Silver cyanide, 100 oz. lots, per oz.	75½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	54.30

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	25¼
Yellow brass	19¾	18
Red brass	23	22¼
Comm. bronze	23⅞	22⅞
Mang. bronze	18½	17½
Yellow brass rod ends	19½	....

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	22¼
No. 2 copper wire	21⅛—22
Light copper	20 —20⅛
*Refinery brass	19

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	23 —23⅛
No. 2 copper wire	21½
Light copper	20
No. 1 composition	17 —17⅛
No. 1 comp. turnings	16½—17
Rolled brass	14 —14⅛
Brass pipe	15 —16
Radiators	13 —13⅛
Aluminum	
Mixed old cast	12½—13
Mixed new clips	14 —14⅛
Mixed turnings, dry	13 —13⅛
Pots and pans	12½—13

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	21 —22
No. 2 heavy copper and wire	19 —20
Light copper	16½—17½
New type shell cuttings	16½—17½
Auto radiators (unsweated)	11 —11½
No. 1 composition	15 —16
No. 1 composition turnings	14½—15½
Unlined red car boxes	13 —13½
Cocks and faucets	13 —13½
Mixed heavy yellow brass	10 —10½
Old rolled brass	13 —13½
Brass pipe	14½—15
New soft brass clippings	18⅛
Brass rod ends	17½
No. 1 brass rod turnings	13

Aluminum

Alum. pistons and struts	6½
Aluminum crankcases	9
2S aluminum clippings	13
Old sheet and utensils	9
Borings and turnings	6½
Misc. cast aluminum	9
Dural clips (24S)	10

Zinc

New zinc clippings	5½— 6½
Old zinc	4 — 4½
Zinc routings	2¾— 3
Old die cast scrap	3 — 3½

Nickel and Monel

Pure nickel clippings	80
Clean nickel turnings	50
Nickel anodes	80
Nickel rod ends	80
New Monel clippings	30 —33
Clean Monel turnings	23 —25
Old sheet Monel	25 —30
Nickel silver clippings, mixed	14
Nickel silver turnings, mixed	12

Lead

Soft scrap, lead	10½—11
Battery plates (dry)	6 — 6¼
Batteries, acid free	3½— 4

Magnesium

Segregated solids	20 —21
Castings	19 —20

Miscellaneous

Block tin	65 —67
No. 1 pewter	42 —46
No. 1 auto babbitt	37 —40
Mixed common babbitt	11½—12½
Solder joints	15 —16½
Siphon tops	35
Small foundry type	14½—15½
Monotype	13¼—14½
Lino. and stereotype	13⅛—13½
Electrotype	11 —11½
Hand picked type shells	7 — 8
Lino. and stereo. dross	5 — 5½
Electro dross	3½— 4½

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- METALLIC RESIDUES
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Scrap Prices Wilt in Heat Wave

Market continues its toboggan run . . . Bears dominate the trade . . . Little hope of improvement until second half of September . . . Scrap Composite off $1.33 to $38.67.

Scrap prices wilted faster than a boiled collar during last week's heat wave. Virtually all districts reported the same thing:

"Little is moving except on old orders. Prices are down $2 to $3 per ton. Trade sentiments are definitely pessimistic. Best hope of improvement lies in orders from major consumers later in the month. And most of these will be for October delivery."

Many brokers and dealers felt that the market hadn't yet touched bottom. Mill inventories are large, steelmaking operations are off, hot metal capacity is high, and steelmakers want to cut costs whenever possible in face of declining demand. Best hope seemed to be for the market to stabilize somewhat in the next week or two.

Meanwhile, THE IRON AGE No. 1 Steel Scrap Composite dropped another $1.33 to $38.67 per gross ton, lowest quotation in over 3 years. Turnings were soft, with prices off about $1 in most areas. Cast ranged from ailing to dead.

Openhearth scrap dropped $1 per gross ton in Pittsburgh, the Valley and Chicago. It was off $1 to $2 in Philadelphia. Low phos and railroad grades fared no better.

In some quarters it was felt that scrap price levels are just in a shakedown period that will bring them to more realistic levels. The Korean War and the 100 plus steelmaking rates it brought had the effect of inflating scrap prices. Now they're coming back.

Pittsburgh—Scrap prices took another drop this week. Openhearth grades and low phos were off $1 per ton. Blast furnace material slipped $1, and railroad scrap was off $1 to $3. Cast also was weaker. End of the toboggan ride is nowhere in sight. With more-than-ample inventories and the prospect of reduced operations in fourth quarter, the mills are looking for still lower prices. Major consumers are out of the market.

Chicago—With an almost complete absence of sales last week, Chicago scrapmen were shooting in the dark on asking prices. Sales were scattered and tonnages were small, but asking prices were continuing to drop. The turnings situation in Milwaukee was described as "completely dead." Turnings had held reasonably well the week previous despite lack of tonnage sales, but this week optimism had gone out of that quarter of the market. Cast continued to slide, and in all grades what had been the bottom of the market was now regarded as top price. Nickel turnings were piling.

Philadelphia — Chemical borings, cupola cast and charging box cast held their own pricewise this week. All other grades continued the downtrend with steelmaking grades $1 to $2 lower and blast furnace material and low phos off $1. Forecasts in the trade are glum. One broker said he "wouldn't be surprised if the market leveled out with No. 1 just over $30 and No. 2 under $30 a ton."

New York — What little business there was here last week was almost all in old orders. Brokers expected a major consumer to place new orders this week at $3 to $4 under its previous payments. Turnings were very slow and off about $1 pricewise for most grades. Cast was softening, with prices also off $1 in most cases.

Detroit — Market remained dormant after significant sales last week sent prices tumbling to their present levels. Prices of No. 2 openhearth and blast furnace grades are in a fluid state in the absence of any buying. Best hopes are that some major consumers will come into the market this week and establish a floor under price levels.

Cleveland — Low bidding on railroad scrap and continued inactivity has forced prices down $1 to $2 in this area. Brokers are fearful that they will have to lay scrap down as local mills show absolutely no interest in buying September tonnages. There is some hope that model changes in Detroit may halt the downward spiral.

Birmingham—The customary fairly heavy first of month purchases of blast furnace and openhearth scrap by northern mills from southern yards were not forthcoming this week. Some mills were reported out of the market entirely while others were buying limited quantities. Southern mills also were out of the market. There was a fair movement of foundry scrap at unchanged prices.

St Louis—Scrap consumers here seem intent on reducing inventories, are not expected to come into the market until late this month for shipment in October. A few more downward prices are reported.

Cincinnati—There wasn't a breath of life in this market at press time as local consumers rested on their inventories. Bearish tone became stronger as one large consumer was expected to show little interest in scrap purchases after the holiday. Picture is dark enough to warrant talk of shipping material to other districts by barge.

Buffalo—Scrap market continued in the doldrums here. Dealers find it difficult to locate new business even at recently reduced prices. Weakness in other markets is also a pessimistic factor. Outside buying has vanished except for No. 1 steel. Prices are nominally unchanged.

Boston—The New England market is still on the downgrade with 50¢ shaved from No. 1 steelmaking grades and $1 to $2 lopped off No. 2 grades. Turnings also declined 50¢ to $2. Activity was still at a low ebb and hope was expressed in the trade that things would pick up later in the month.

West Coast—Cast market continued firm in Los Angeles and San Francisco last week with prices unchanged at $39. Dealer inventories are fair. Steel scrap market continued weak. Mills are still buying, but a general pessimistic outlook prevails.

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Scrap Prices

(Effective Sept. 8, 1953)

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 bundles	41.00 to 42.00
No. 2 bundles	34.00 to 35.00
Machine shop turn.	24.00 to 25.00
Mixed bor. and ms. turns.	24.00 to 25.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. punch'gs, plate	44.00 to 45.00
Heavy turnings	36.00 to 37.00
No. 1 RR. hvy. melting	43.00 to 44.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	52.00 to 53.00
RR. steel wheels	46.00 to 47.00
RR. spring steel	46.00 to 47.00
RR. couplers and knuckles	46.00 to 47.00
No. 1 machinery cast.	47.00 to 48.00
Cupola cast	39.00 to 40.00
Heavy breakable cast	37.00 to 38.00
Malleable	45.00 to 46.00

Chicago

No. 1 hvy. melting	$35.00 to $37.00
No. 2 hvy. melting	30.00 to 32.00
No. 1 factory bundles	38.00 to 39.00
No. 1 dealers' bundles	34.00 to 36.00
No. 2 dealers' bundles	27.00 to 29.00
Machine shop turn.	16.00 to 18.50
Mixed bor. and turn.	18.00 to 20.00
Shoveling turnings	18.00 to 20.00
Cast iron borings	18.00 to 20.00
Low phos. forge crops	43.00 to 44.00
Low phos. punch'gs, plate	38.00 to 39.00
Low phos. 3 ft and under	37.00 to 38.00
No. 1 RR. hvy. melting	36.00 to 38.00
Scrap rails, random lgth.	42.00 to 44.00
Rerolling rails	51.00 to 53.00
Rails 2 ft and under	50.00 to 52.00
Locomotive tires, cut	42.00 to 43.00
Cut bolsters & slide frames	41.00 to 43.00
Angles and splice bars	42.00 to 44.00
RR. steel car axles	48.00 to 50.00
RR. couplers and knuckles	42.00 to 43.00
No. 1 machinery cast	38.00 to 40.00
Cupola cast	34.00 to 36.00
Heavy breakable cast	33.00 to 34.00
Cast iron brake shoes	34.00 to 35.00
Cast iron car wheels	37.00 to 38.00
Malleable	41.00 to 42.00
Stove plate	32.00 to 33.00

Philadelphia Area

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	34.50 to 35.50
No. 1 bundles	38.00 to 39.00
No. 2 bundles	32.50 to 33.00
Machine shop turn.	23.00 to 25.00
Mixed bor., short turn.	25.00 to 27.00
Shoveling turnings	27.00 to 29.00
Clean cast chem. borings	38.00 to 39.00
Low phos. 5 ft and under	42.00 to 43.00
Low phos. 2 ft and under	44.00 to 45.00
Low phos. punchings	44.00 to 45.00
Elec. furnace bundles	41.00 to 42.00
Heavy turnings	37.00 to 38.00
RR. steel wheels	47.00 to 48.00
RR. spring steel	47.00 to 48.00
Rails 18 in. and under	50.00 to 51.00
Cupola cast	36.00 to 37.00
Heavy breakable cast	38.50 to 39.50
Cast iron carwheels	43.00 to 44.00
Malleable	43.00 to 44.00
Unstripped motor blocks	29.00 to 30.00
No. 1 machinery cast	44.00 to 45.00
Charging box cast	37.00 to 38.00

Cleveland

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	32.00 to 33.00
No. 1 busheling	39.00 to 40.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Low phos. 2 ft and under	43.00 to 44.00
Drop forge flashings	39.00 to 40.00
No. 1 RR. hvy. melting	43.00 to 44.00
Rails 3 ft and under	49.00 to 50.00
Rails 18 in. and under	51.00 to 52.00
Railroad grate bars	35.00 to 36.00
Steel axle turnings	33.00 to 35.00
Railroad cast	45.00 to 46.00
No. 1 machinery cast	46.00 to 47.00
Stove plate	40.00 to 41.00
Malleable	46.00 to 47.00

Youngstown

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 bundles	41.00 to 42.00
No. 2 bundles	34.00 to 35.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. plate	46.00 to 47.00

Buffalo

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	37.00 to 37.50
No. 1 busheling	40.00 to 41.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	35.00 to 35.50
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	28.00 to 28.50
Shoveling turnings	29.00 to 29.50
Cast iron borings	28.00 to 28.50
Low phos. plate	42.00 to 43.00
Scrap rails, random lgth.	44.00 to 45.00
Rails 2 ft and under	50.00 to 51.00
RR. steel wheels	50.00 to 50.50
RR. spring steel	50.00 to 50.50
RR. couplers and knuckles	50.00 to 50.50
No. 1 machinery cast.	41.00 to 42.00
No. 1 cupola cast.	37.00 to 38.00

Detroit

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 bundles, openhearth	36.00 to 37.00
No. 2 bundles	26.00 to 27.00
New busheling	33.00 to 34.00
Drop forge flashings	33.00 to 34.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Electric furnace, bundles	36.00 to 37.00
Low phos. punch'gs, plate	36.00 to 37.00
No. 1 cupola cast.	**43.00**
Heavy breakable cast.	**33.00**
Stove plate	**35.00**
Automotive cast.	**43.00**

St. Louis

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	**32.00 to 33.00**
No. 2 bundled sheets	28.00 to 30.00
Machine shop turn.	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Shoveling turnings	18.00 to 20.00
No. 1 RR. hvy. melting	41.00 to 42.00
Rails, random lengths	43.50 to 44.50
Rails 18 in. and under	48.00 to 49.00
Locomotive tires, uncut	41.00 to 43.00
Angles and splice bars	45.00 to 46.00
Std. steel car axles	45.00 to 46.00
RR. spring steel	44.00 to 45.00
Cupola cast.	**40.00 to 41.00**
Hvy. breakable cast.	32.00 to 33.00
Cast iron brake shoes	39.00 to 40.00
Stove plate	34.00 to 35.00
Cast iron car wheels	42.00 to 43.00
Malleable	42.00 to 45.00
Unstripped motor blocks	32.00 to 33.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
No. 2 bundles	25.00 to 26.00
Low phos. 2 ft and less	33.00 to 34.00
Machine shop turn.	15.50 to 16.50
Mixed bor. and turn.	18.50 to 19.50
Shoveling turnings	20.00 to 21.00
Clean cast chem. borings	28.00 to 29.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	31.00 to 32.00
Charging box cast.	31.00 to 31.50
Heavy breakable cast.	31.00 to 31.50
Unstripped motor blocks	21.00 to 21.50

Birmingham

No. 1 hvy. melting	$26.00 to $26.50
No. 2 hvy. melting	24.00 to 24.50
No. 1 bundles	26.00 to 26.50
No. 2 bundles	22.00 to 22.50
No. 1 busheling	26.00 to 26.50
Machine shop turn.	19.50 to 20.50
Shoveling turnings	20.50 to 22.50
Cast iron borings	22.75 to 23.75
Electric furnace bundles	25.00 to 26.50
Bar crops and plate	38.00 to 39.00
Structural and plate, 2 ft	36.00 to 38.00
No. 1 RR. hvy. melting	30.00 to 30.50
Scrap rails, random lgth.	39.00 to 40.00
Rails, 18 in. and under	42.00 to 43.00
Angles & splice bars	42.00 to 43.00
Std. steel axles	43.00 to 44.00
No. 1 cupola cast.	41.00 to 42.50
Stove plate	38.00 to 39.50
Cast iron car wheels	34.00 to 35.00
Charging box cast.	29.00 to 30.00
Heavy breakable	35.00 to 36.00
Unstripped motor blocks.	32.00 to 33.00
Mashed tin cans	17.00 to 18.00

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$29.00 to $29.50
No. 2 hvy. melting	24.00
No. 1 bundles	29.00 to 29.50
No. 2 bundles	22.00
No. 1 busheling	29.00 to 29.50
Elec. furnace, 3 ft & under	30.00 to 30.50
Machine shop turn.	14.00
Mixed bor. and short turn.	18.00 to 18.50
Shoveling turnings	19.00 to 19.50
Clean cast chem. borings	27.17
No. 1 machinery cast.	31.00 to 32.00
Mixed cupola cast.	28.00 to 28.50
Heavy breakable cast.	30.00
Stove plate	24.00 to 24.50
Unstripped motor blocks.	22.00

Cincinnati

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$33.00 to $35.00
No. 2 hvy. melting	30.00 to 32.00
No. 1 bundles	33.00 to 35.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. 18 in. & under	44.00 to 45.00
Rails, random lengths	44.00 to 45.00
Rails, 18 in. and under	53.00 to 54.00
No. 1 cupola cast.	42.00 to 43.00
Hvy. breakable cast.	37.00 to 38.00
Drop broken cast.	48.00 to 49.00

San Francisco

No. 1 hvy. melting	$27.00
No. 2 hvy. melting	23.00
No. 1 bundles	24.00
No. 2 bundles	21.00
No. 3 bundles	17.00
Machine shop turn.	9.00
Cast iron borings	14.00
No. 1 RR, hvy. melting	27.00
No. 1 cupola cast.	39.00

Los Angeles

No. 1 hvy. melting	$24.00
No. 2 hvy. melting	20.00
No. 1 bundles	22.00
No. 2 bundles	20.00
No. 3 bundles	16.00
Mach. shop turn.	8.00
Shoveling turnings	12.00
Cast iron borings	12.00
Elec. fur. 1 ft and under	23.00
No. 1 RR, hvy. melting	24.00
No. 1 cupola cast.	39.00

Seattle

No. 1 hvy. melting	$31.00
No. 2 hvy. melting	$27.00 to 29.00
No. 1 bundles	28.00
No. 2 bundles	23.00
No. 1 cupola cast.	37.00
Mixed yard cast.	35.00

Hamilton Ont.

No. 1 hvy. melting	$32.00
No. 1 bundles	32.50
No. 2 bundles	32.00
Mechanical bundles	30.50
Mixed steel scrap	28.50
Bushelings	27.50
Bush., new fact. prep'd.	30.50
Bush., new fact. unprep'd.	29.50
Short steel turnings	22.50
Mixed bor. and turn.	26.50
Rails, remelting	32.50
Rails, rerolling	41.00
Cast scrap	48.00

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

(Effective Sept. 8, 1953)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Sept. 8 1953	Sept. 1 1953	Aug. 11 1953	Sept. 9 1952
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	3.925¢	3.925¢	3.925¢	3.775¢
Cold-rolled sheets	4.775	4.775	4.775	4.575
Galvanized sheets (10 ga.)	5.275	5.275	5.275	5.075
Hot-rolled strip	3.925	3.925	3.925	3.725
Cold-rolled strip	5.575	5.575	5.575	5.20
Plate	4.10	4.10	4.10	3.90
Plates wrought iron	9.00	9.00	9.00	9.00
Stainl'a C-R strip (No. 302)	41.50	41.50	41.50	36.75*
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$8.95	$8.95	$8.95	$8.95
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.65
Special coated mfg. ternes	7.75	7.75	7.75	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.15¢	4.15¢	4.15¢	3.95¢
Cold finished bars	5.20	5.20	5.20	4.925
Alloy bars	4.875	4.875	4.875	4.675
Structural shapes	4.10	4.10	4.10	3.85
Stainless bars (No. 302)	35.50	35.50	35.50	31.50*
Wrought iron bars	10.05	10.05	10.05	10.05
Wire: (per pound)				
Bright wire	5.525¢	5.525¢	5.525¢	5.225¢
Rails: (per 100 lb.)				
Heavy rails	$4.325	$4.325	$4.325	$3.775
Light rails	5.20	5.20	5.20	4.25
Semifinished Steel: (per net ton)				
Rerolling billets	$62.00	$62.00	$62.00	$59.00
Slabs, rerolling	62.00	62.00	62.00	59.00
Forging billets	75.50	75.50	75.50	70.50
Alloy blooms, billets, slabs	82.00	82.00	82.00	76.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.525¢	4.525¢	4.525¢	4.325¢
Skelp	3.75	3.75	3.75	3.55
Finished Steel Composite: (per pound)				
Base price	4.634¢	4.634¢	4.634¢	4.376¢

* Add 4.7 pct.

	Sept. 8 1953	Sept. 1 1953	Aug. 11 1953	Sept. 9 1952
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$62.19	$62.19	$62.19	$60.69
Foundry, Valley	56.50	56.50	56.50	55.00
Foundry, Southern, Cin'ti	60.43	60.43	60.43	58.93
Foundry, Birmingham	52.88	52.88	52.88	51.38
Foundry, Chicago†	56.50	56.50	56.50	55.00
Basic del'd, Philadelphia	61.27	61.27	61.27	59.77
Basic, Valley furnace	56.00	56.00	56.00	54.50
Malleable, Chicago†	56.50	56.50	56.50	55.00
Malleable, Valley	56.50	56.50	56.50	55.00
Ferromanganese‡, cents per lb.	10.00¢	10.00¢	10.00¢	9.90¢
Pig Iron Composite: (per gross ton)				
Pig iron	$56.76	$56.76	$56.76	$55.26
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	*$41.50*	$42.50	$45.50	$43.00*
No. 1 steel, Phila. area	*38.50*	40.50	44.25	41.50*
No. 1 steel, Chicago	*36.00*	37.00	42.50	41.50*
No. 1 bundles, Detroit	36.50	36.50	40.50	41.15*
Low phos., Youngstown	*46.50*	47.00	48.50	46.50*
No. 1 mach'y cast, Pittsburgh	*47.50*	48.50	49.50	52.00
No. 1 mach'y cast, Philadel'a	*44.50*	45.50	46.50	52.00†
No. 1 mach'y cast, Chicago	*39.00*	41.00	46.50	48.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	*$38.67*	$40.00	$44.42	$42.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.75
Foundry coke, prompt	17.25	17.25	17.25	17.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	29.50‡	29.50‡	29.25‡	24.50
Copper, Lake, Conn.	30.125	30.125	30.125	24.625
Tin, Straits, New York	*82.75†*	83.50*	78.50	81.21½
Zinc, East St. Louis	*10.50*	11.00	11.00	14.00
Lead, St. Louis	13.80	13.80	13.80	15.80
Aluminum, virgin ingot	21.50	21.50	21.50	20.00
Nickel, electrolytic	63.08	63.08	63.08	59.58
Magnesium, ingot	27.00	27.00	27.00	24.50
Antimony, Laredo, Tex.	34.50	34.50	34.50	39.00

† Tentative. ‡ Average. * Revised

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	58.00	58.50	59.00	59.50	.....
Birmingham *R3*	52.38	52.88	.....	.....	.....
Birmingham *W9*	52.38	52.88	.....	.....	.....
Birmingham *S5*	52.38	52.88	.....	.....	.....
Buffalo *R3*	56.00	56.50	57.00	.....	.....
Buffalo *H1*	56.00	56.50	57.00	.....	.....
Buffalo *W6*	56.00	56.50	57.00	.....	.....
Chicago *I4*	56.00	56.50	56.50	57.00	.....
Cleveland *A5*	56.00	56.50	56.50	57.00	61.00
Cleveland *R3*	56.00	56.50	56.50	.....	.....
Daingerfield *L3*	52.50	52.50	52.50	.....	.....
Duluth *I4*	56.00	56.50	56.50	57.00	.....
Erie *I4*	56.00	56.50	56.50	.....	.....
Everett *M6*	.....	63.25	63.75	57.00	.....
Fontana *K1*	62.00	62.50	.....	.....	.....
Geneva, Utah *C7*	56.00	56.50	56.50	57.00	61.00
Granite City *G2*	57.90	58.40	58.90	.....	.....
Hubbard *Y1*	.....	.....	56.50	.....	.....
Minnequa *C6*	58.00	59.00	59.00	.....	.....
Monessen *P6*	56.00	.....	.....	.....	.....
Neville Isl. *P4*	56.00	56.50	56.50	.....	.....
Pittsburgh *U1*	56.00	.....	.....	57.00	.....
Sharpsville *S3*	56.00	56.50	56.50	57.00	.....
Steelton *B3*	58.00	58.50	59.00	59.50	64.00
Swedeland *A2*	60.00	60.50	61.00	61.50	.....
Toledo *I4*	56.00	56.50	56.50	57.00	.....
Troy, N. Y. *R3*	58.00	58.50	59.00	59.50	64.00
Youngstown *Y1*	.....	.....	56.50	57.00	.....
N. Tonawanda *T1*	.....	56.50	57.00	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 and over.

Silvery Iron: Buffalo, *H1*, $68.25; Jackson, *J1*, *G1*, $67.00. Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct or more phosphorus. Manganese as above Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEELS

Base price cents per lb., f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00	.....	14.25
Slabs, billets, rerolling	20.50	22.75	24.75	23.75	36.25	29.50	32.25	18.25	.....	18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50-46.75	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25-37.50	37.50	39.75	39.75	59.00	45.75-46.00	51.25	30.00	30.50-31.00	30.50
Sheets	46.25	46.50	48.75	48.75	64.50	55.50	60.75	40.75	41.25	43.50
Strip, hot-rolled	29.75	32.00	36.75	34.25	55.00	42.00	46.50	26.25	.....	27.00
Strip, cold-rolled	38.25-38.50	41.50	45.50	43.75	66.50	54.50	59.25	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* McKeesport, Pa., *U1;* Washington, Pa., *W2,* (type 316 add 4.5¢) *J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Lockport, N. Y., *R4.*

Strip: Midland, Pa., *C11;* Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* (type 316 add 4.5¢); W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Middletown, O., *A7;* Harrison, N. J., *D3;* Youngstown, *C5;* Lockport, N. Y., *S4;* Sharon, Pa., *S1* (type 301 add ¾¢); Butler, Pa., *A7;* Wallingford, Conn., *W1.*

Bars: Baltimore, *A7;* Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Lockport, N. Y., *S4;* Canton, O., *T5;* Ft. Wayne, *J4.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11.*

Plates: Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Lockport, N. Y., *S4;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3.*

Forged discs, die blocks, rings: Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa., *J2.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11.*

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STEEL PRICES

(Effective Sept. 8, 1953)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PILING	SHAPES STRUCTURALS		STRIP			
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Sheet Steel	Carbon	Hi Str. Low Alloy	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem, Pa.					$82.00 *B3*			4.15 *B3*	6.20 *B3*				
	Buffalo, N. Y.			$62.00 *B3*	$75.50 *B3, R3*	$82.00 *B3, R3*		4.925 *B3*	4.15 *B3*	6.20 *B3*	3.925 *B3, R3*	5.45 *B3*	6.00 *B3*	8.425 *B3*
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.										4.325 *A2*		6.20 *A2*	
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.			$62.00 *B3*	$75.50 *B3*	$82.00 *B3*			4.15 *B3*	6.20 *B3*				
	Morrisville, Pa.													
	New Haven, Conn.											5.95 *A5* 6.20 *D1*		
	Phoenixville, Pa.								4.95 *P2*					
	Sparrows Pt., Md.										3.925 *B3*	5.45 *B3*	6.00 *B3*	8.425 *B3*
	Worcester, Mass.													
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										4.20 *L1*			
	Ashland, Ky.										3.925 *A7*			
	Canton-Massillon, Dover, Ohio				$75.50 *R3*	$82.00 *R3*								
	Chicago, Ill.			$62.00 *U1*	$75.50 *R3, U1, W8*	$82.00 *U1, W8, R3*		4.925 *U1*	4.10 *U1, W8*	6.175 *U1, Y1*	3.925 *A1, W8*	5.95 *A1*	5.95 *R3*	
	Sterling, Ill.													
	Cleveland, Ohio				$75.50 *R3*							5.45 *A5, J3*		7.80 *J3* 8.15 *A5*
	Detroit, Mich.		$63.00 *R5*		$78.50 *R5*	$85.00 *R5*					4.225 *G3* 4.40 *M2*	5.65 *G3, M2* 5.95 *D1* 6.05 *D2*	6.50 *G3*	7.90 *D2* 8.50 *G3*
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana			$62.00 *U1*	$75.50 *U1*	$82.00 *U1, Y1*		4.925 *I3*	4.10 *I3, U1*	6.175 *U1, I3*	3.925 *I3, U1, Y1*	5.70 *I3*	5.95 *U1, I3* 6.45 *Y1*	
	Granite City, Ill.													
	Kokomo, Ind.													
	Mansfield, Ohio											5.95 *E2*		
	Middletown, Ohio											5.45 *A7*		
	Niles, Ohio Sharon, Pa.										4.225 *S1*	5.80 *S1*	5.95 *S1*	7.65 *S1*
	Pittsburgh, Pa. Midland, Pa.	$59.00 *U1*	$62.00 *U1*	$62.00 *U1* $62.50 *J3*	$75.50 *J3 U1*	$82.00 *U1*	3.75 *U1* 3.85 *J3*	4.925 *U1*	4.10 *J3, U1*	6.175 *J3, U1*	4.425 *S7, S9* 3.925 *A7*	5.45 *B4 J3* 6.15 *S7*		7.80 *J3*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.								4.35 *W3*		4.025 *W3*	5.45 *F3, W3*	6.30 *W3*	8.30 *W3*
	Youngstown, Ohio					$82.00 *Y1, C10*	3.75 *R3, U1*		4.10 *Y1*	6.675 *Y1*	3.925 *R3, U1, Y1*	5.45 *R3, Y1* 5.95 *C5*	5.95 *U1, R3* 6.45 *Y1*	7.60 *R3* 8.30 *Y1*
WEST	Fontana, Cal.	$86.00 *K1*	$88.00 *K1*	$81.00 *K1*	$94.50 *K1*	$101.00 *K1*			4.75 *K1*	6.825 *K1*	4.70 *K1*	7.35 *K1*	7.05 *K1*	
	Geneva, Utah				$75.50 *C7*				4.10 *C7*	6.175 *C7*				
	Kansas City, Mo.								4.80 *S2*	6.875 *S2*	4.625 *S2*		6.65 *S2*	
	Los Angeles, Torrance, Cal.				$94.50 *B2*	$102.00 *B2*			4.80 *B2, C7*	6.85 *B2*	4.675 *B2, C7*			
	Minnequa, Colo.								4.55 *C6*		4.025 *C6*			
	San Francisco, Niles, Pittsburg, Cal.				$94.50 *B2*				4.75 *B2* 4.91 *P9*	6.80 *B2*	4.675 *B2, C7*			
	Seattle, Wash.				$94.50 *B2, S11*				4.85 *B2*	6.90 *B2*				
SOUTH	Atlanta, Ga.										4.175 *A8*			
	Fairfield, Ala. Alabama City, Ala.			$62.00 *T2*	$75.50 *T2*				4.10 *R3, T2*	6.175 *T2*	3.925 *R3, T2*		5.95 *T2*	
	Houston, Texas				$85.50 *S2*	$92.00 *S2*			4.60 *S2*		4.425 *S2*			

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

IRON AGE

STEEL PRICES

(Effective Sept. 8, 1953)

SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	
Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.	
													Bethlehem, Pa.
3.925 *B3*	4.775 *B3*				5.90 *B3*	7.225 *B3*			4.525 *W6*				Buffalo, N. Y.
										† Special coated mfg terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb deduct $2.20 from 1.25-lb coke base box. * COKES: 1.50-lb add 25¢. ELECTRO: 0.50-lb add 25¢; 0.75-lb add 65¢.			Claymont, Del.
													Coatesville, Pa.
4.325 *A2*					6.15 *A2*								Conshohocken, Pa
													Harrisburg, Pa.
													Hartford, Conn.
									4.525 *B3*				Johnstown, Pa.
4.025 *U1*	4.875 *U1*									$8.80 *U1*	$7.50 *U1*	6.60 *U1*	Morrisville, Pa.
													New Haven, Conn.
													Phoenixville, Pa.
3.925 *B3*	4.775 *B3*	5.275 *B3*			5.90 *B3*	7.225 *B3*	8.075 *B3*		4.625 *B3*	$8.80 *B3*	$7.50 *B3*		Sparrows Pt., Md.
									4.825 *A5*				Worcester, Mass.
													Trenton, N. J.
									4.70 *L1*				Alton, Ill.
3.925 *A7*		5.275 *A7*	5.175 *A7*										Ashland, Ky.
		5.275 *R3* 5.675 *R1*						5.825 *R1*					Canton-Massillon, Dover, Ohio
3.925 *A1, W8*					5.90 *U1*				4.525 *A5, N4, R3*				Chicago, Ill.
									4.625 *N4*				Sterling, Ill.
3.925 *J3, R3*	4.775 *J3, R3*		5.175 *R3*		5.90 *J3, R3*	7.225 *J3, R3*			4.525 *A5*				Cleveland, Ohio
4.125 *G3*	4.975 *G3*				6.375 *G3*	7.675 *G3*							Detroit, Mich.
													Duluth, Minn.
3.925 *I3, U1, Y1*	4.775 *I3, U1, Y1*	5.275 *U1* 5.325 *I3*	5.175 *I3, U1*	5.675 *U1*	5.90 *U1, I3* 6.40 *Y1*	7.225 *U1* 7.725 *Y1*				$8.70 *I3, U1, Y1*	$7.40 *I3, U1*	6.10 *U1, Y1*	Gary, Ind. Harbor, Indiana
4.30 *G2*	5.27 *G2*	5.475 *G2*	5.875 *G2*								$7.60 *G2*	6.30 *G2*	Granite City, Ill.
		5.375 *C9*											Kokomo, Ind.
				6.25 *E2*				5.80 *E2*					Mansfield, Ohio
	4.775 *A7*		5.175 *A7*	5.675 *A7*									Middletown, Ohio
4.225 *S1* 5.425 *N3*	5.80 *N3*		6.775 *N3*	5.45 *S1* 6.00 *N3*	5.90 *S1*						$7.40 *R3*		Niles, Ohio Sharon, Pa.
3.925 *J3, U1, P6, A7*	4.775 *J3, U1*	5.275 *U1*	5.175 *U1*		5.90 *J3, U1*	7.225 *J3, U1*	7.925 *U1*		4.525 *A5* 4.725 *P6*	$8.70 *J3, U1*	$7.40 *J3, U1*	6.10 *U1*	Pittsburgh, Pa. Midland, Pa.
									4.725 *P7*				Portsmouth, Ohio
3.925 *W3, W5*	4.775 *W3, W5* 5.775 *F3*	5.275 *W3, W5*		5.675 *W3, W5*	6.175 *W3*	7.475 *W3*				$8.70 *W3, W5*	$7.40 *W3, W5*	6.55 *W5* 6.10 *F3*	Weirton, Wheeling, Follansbee, W. Va.
3.925 *R3, U1, Y1*	4.775 *R3, Y1*	5.175 *Y1*			5.90 *U1, R3* 6.40 *Y1*	7.225 *R3* 7.725 *Y1*			4.525 *Y1*	$8.70 *R3*			Youngstown, Ohio
4.70 *K1*	5.875 *K1*				7.00 *K1*	8.275 *K1*			5.325 *K1*				Fontana, Cal.
4.025 *C7*													Geneva, Utah
								4.775 *C6*	4.865 *S2*				Kansas City, Mo.
4.625 *C7*		6.275 *C7*						5.325 *B2*					Los Angeles, Torrance, Cal.
									4.775 *C6*				Minnequa, Colo.
4.625 *C7*	5.725 *C7*	6.025 *C7*							5.175 *C7*	$9.45 *C7*	$8.15 *C7*		San Francisco, Niles, Pittsburg, Cal.
													Seattle, Wash.
													Atlanta, Ga.
3.925 *R3, T2*	4.775 *T2*	5.275 *R3, T2*			5.90 *T2*			5.125 *T2* 5.225 *R3*	4.525 *T2, R3*	$8.80 *T2*	$7.50 *T2*		Fairfield, Ala. Alabama City, Ala.
4.425 *S2*									4.925 *S2*				Houston, Texas

STEEL PRICES

(Effective Sept. 8, 1953)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's Bright
EAST	Bethlehem, Pa.				4.875 *B3*	6.325 *B3*	6.225 *B3*					
	Buffalo, N. Y.	4.15 *B3,R3*	4.15 *B3,R3*	5.25 *B5*	4.875 *B3,R3*	6.325 *B3* 6.325 *B5*	6.225 *B3*	4.10 *B3*			6.25 *B3*	5.525 *W6*
	Claymont, Del.							4.55 *C4*		5.65 *C4*		
	Coatesville, Pa.							4.35 *L4*		5.75 *L4*		
	Conshohocken, Pa.							4.55 *A2*	5.15 *A2*		6.50 *A2*	
	Harrisburg, Pa.							6.50 *C3*				
	Hartford, Conn.			5.75 *R3*		6.775 *R3*						
	Johnstown, Pa.	4.15 *B3*	4.15 *B3*		4.875 *B3*		6.225 *B3*	4.10 *B3*		5.55 *B3*	6.25 *B3*	5.525 *B3*
	Newark, N. J.			5.65 *W10*		6.65 *W10*						
	New Haven, Conn.											
	Camden, N. J.			5.65 *P10*		6.50 *P10*						
	Putnam, Conn.			5.75 *W10*								
	Sparrows Pt., Md.		4.15 *B3*					4.10 *B3*		5.55 *B3*	6.25 *B3*	5.625 *B3*
	Palmer, Worcester, Mansfield, Mass.			5.75 *B5* 6.10 *W11*		6.775 *B5*						5.825 *A5, W6*
	Readville, Mass.			5.75 *C14*								
MIDDLE WEST	Alton, Ill.											
	Ashland, Ky.							4.10 *A7*				
	Canton-Massillon, Ohio	4.15 *R3*		5.20 *R2,R3*	4.875 *R3*	6.325 *R2,R3*						
	Chicago, Ill.	4.15 *R3, U1, N4,W8*	4.15 *R3,N4*	5.20 *A5,W10, W8,B5,L2*	4.875 *U1, W8,R3*	6.325 *A5,W8, W10,L2,R3, B5*		4.10 *U1,W8*	5.15 *U1*	5.55 *U1*	6.25 *U1*	5.525 *A5, R3,N4* 5.625 *W7*
	Cleveland, Ohio	4.15 *R3*	4.15 *R3*	5.20 *A5,C13*		6.325 *A5,C13*		4.10 *J3,R3*	5.15 *J3*		6.25 *J3*	5.525 *A5, R3,C13*
	Detroit, Mich.	4.30 *R5* 4.50 *G3*		5.35 *R5,P8* 5.40 *B5* 5.45 *P3*	5.025 *R5* 5.225 *G3*	6.475 *R5,P8* 6.525 *B5,P3*	6.875 *G3*	4.65 *G3*			7.10 *G3*	
	Duluth, Minn.											5.525 *A5*
	Gary, Ind. Harbor, Crawfordsville, Indiana	4.15 *I3, U1, Y1*	4.15 *I3, U1, Y1*	5.20 *R3*	4.875 *I3, U1, Y1*	6.325 *R3,M5*	6.225 *U1,I3* 6.725 *Y1*	4.10 *I3, U1, Y1*	5.15 *I3*	5.55 *U1*	6.25 *U1,I3* 6.75 *Y1*	5.625 *M4*
	Granite City, Ill.							4.60 *G2*				
	Kokomo, Ind.											5.625 *C9*
	Sterling, Ill.	4.25 *N4*	4.25 *N4*									5.625 *N4*
	Niles, Ohio Sharon, Pa.							4.10 *S1*		5.70 *S1*	6.25 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.15 *J3, U1*	4.15 *J3, U1*	5.20 *A5, J3, W10,R3,C8*	4.875 *U1,C11*	6.325 *A5, W10,C8*	6.225 *J3, U1*	4.10 *J3, U1*	5.15 *U1*	5.55 *U1*	6.25 *J3, U1*	5.525 *A5, J3,P6*
	Portsmouth, Ohio											5.725 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.30 *W3*						4.40 *W3*				
	Youngstown, Ohio	4.15 *R3, U1, Y1*	4.15 *R3, U1, Y1*	5.20 *Y1,F2*	4.875 *U1, Y1, C10*	6.325 *Y1, C10,F2*	6.225 *U1* 6.725 *Y1*	4.10 *R3, U1, Y1*			6.75 *Y1*	5.525 *Y1*
WEST	Emeryville, Cal.	4.90 *J5*	4.90 *J5*									
	Fontana, Cal.	4.85 *K1*	4.85 *K1*		5.925 *K1*		7.475 *K1*	4.75 *K1*		6.60 *K1*	6.95 *K1*	
	Geneva, Utah							4.10 *C7*			6.25 *C7*	
	Kansas City, Mo.	4.85 *S2*	4.85 *S2*		5.575 *S2*		6.925 *S2*					6.125 *S2*
	Los Angeles, Torrance, Cal.	4.85 *B2,C7*	4.85 *B2,C7*	6.65 *R3*	5.925 *B2*		6.925 *B2*					6.675 *B2*
	Minnequa, Colo.	4.60 *C6*	4.75 *C6*					4.95 *C6*				5.775 *C6*
	Portland, Ore.	4.90 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	4.85 *C7,P9* 4.90 *B2*	4.85 *C7,P9* 4.90 *B2*				6.975 *B2*					6.475 *C7*
	Seattle, Wash.	4.90 *B2,N6*	4.90 *B2,S11*				6.975 *B2*	5.00 *B2*			7.15 *B2*	
SOUTH	Atlanta, Ga.	4.40 *A8*	4.40 *A8*									5.775 *A8*
	Fairfield, Ala. Alabama City, Ala.	4.15 *R3,T2*	4.15 *R3,T2*				6.225 *T2*	4.10 *R3,T2*			6.25 *T2*	5.525 *R3, T2*
	Houston, Texas Ft. Worth, Texas	4.65 *S2*	4.65 *S2*		5.375 *S2*			4.60 *S2*				5.925 *S2*

Steel Prices

(Effective Sept. 8, 1953)

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Glassport, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Co., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mill, Seattle

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Sweet's Steel Co., Williamsport, Pa.
S11 Seidelhuber Steel Rolling Mills, Seattle

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	24.25	8.0	27.25	12.0	29.75	15.5	32.25	16.5	32.75	17.5	33.25	18.0	34.75	18.0								
Youngstown *R3*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0								
Fontana *K1*	13.25	+2.0	16.25	1.0	18.75	4.5	21.25	5.5	21.75	6.5	22.25	7.0	23.75	7.0								
Pittsburgh *J3*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Alton, Ill. *L1*																						
Sharon *M3*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0								
Pittsburgh *N1*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Wheeling *W5*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0								
Wheatland *W4*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0								
Youngstown *Y1*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Indiana Harbor *Y1*	25.25	9.0	28.25	13.0	30.75	16.5	33.25	17.5	33.75	18.5	34.25	19.0	35.75	19.0								
Lorain *N2*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	27.75	13.0	31.75	17.0	33.75	20.5	34.25	19.5	34.75	20.5	35.25	21.0	35.75	20.0								
Youngstown *R3*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0								
Fontana *K1*	16.75		20.75		22.75		23.25		23.75		24.25		24.75									
Pittsburgh *J3*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Alton, Ill. *L1*																						
Sharon *M3*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0								
Pittsburgh *N1*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Wheeling *W5*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0								
Wheatland *W4*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0								
Youngstown *Y1*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Indiana Harbor *Y1*	28.75	14.0	32.75	18.0	34.75	21.5	35.25	20.5	35.75	21.5	36.25	22.0	36.75	21.0								
Lorain *N2*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75

Galvanized discounts based on zinc, at 11¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only buttweld and seamless, 2¼ pts. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 4½ pts. higher discount. Buttweld jobbers' discount, 5 pct. East St. Louis zinc price now 11.0¢.

Steel Prices

(Effective Sept. 8, 1953)

CLAD STEEL

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct.		
Coatesville, Pa. *L4*	*32.7	
Washington, Pa. *J2*	.....	
Claymont, Del. *C4*	.....	
New Castle, Ind. *I2*	.....	32.50
Nickel-carbon		
10 pct. Coatesville, Pa. *L4*	37.5	
Inconel-carbon		
10 pct. Coatesville, Pa. *L4*	46.10	
Monel-carbon		
10 pct. Coatesville, Pa. *L4*	38.90	
Aluminized steel sheets, hot dip, Butler, Pa., *A7*		.....

* Includes annealing and pickling, sandblasting.

CAST IRON WATER PIPE

Per Net Ton

6 to 24-in., del'd Chicago $110.30 to $113.80
6 to 24-in., del'd N.Y... 113.50 to 114.50
6 to 24-in., Birmington. 96.50 to 101.00
6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less .....$128.00 to $130.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

ELECTRICAL SHEETS

22 Ga. H-R cut length F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech Bottom *W5*	....	8.35	9.60	10.40	10.95	11.50	12.20
Brackenridge *A3*	....	8.35	9.60	10.40	10.95	.....	12.20
Granite City *G2*	....	8.55	9.80	.....	.....	.....	.....
Ind. Harbor *I3*	7.85	8.35	9.60	.....	.....	.....	.....
Mansfield *E2*	7.85	8.35	9.60	10.40	.....	.....	.....
Newport, Ky. *N5*	7.85	8.35	9.60	10.40	10.95	.....	.....
Niles, O. *N3*	7.85	8.35	.....	.....	.....	.....	.....
Vandergrift *U1*	7.85	8.35	9.60	10.40	10.95	11.50	12.20
Warren, O. *R3*	7.85	8.35	9.60	.....	.....	.....	.....
Zanesville *A7*	7.85	8.35	9.60	10.40	10.95	11.50	12.20

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.66
18	4	1	—	5	2.34
18	4	2	—	—	1.82
1.5	4	1.5	8	—	.895
6	4	2	6	—	1.065

High-carbon chromium ..... .70
Oil hardened manganese ..... .39
Special carbon ..... .355
Extra carbon ..... .30
Regular carbon ..... .25

Warehouse prices on and east of Mississippi are 3.5¢ per lb. higher. West of Mississippi, 5.5¢ higher.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence 9–15½ ga.	"17" Fence Posts	Single Loop Bale Ties	Twisted Barbless Wire	Galv. Barbed Wire	Merch. Wire Ann'd	Merch. Wire* Galv.
	Col	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	131	140	...	149	...	153	6.675	7.075
Aliquippa, Pa. *J3*	131	143	...	...	...	150	6.675	7.20
Atlanta *A8*	134	146	...	152	...	159	6.925	7.475
Bartonville *K2*	131	143	...	...	...	156	...	...
Buffalo *W6*	...	...	...	...	...	...	...	...
Chicago, Ill. *N4*	131	143	...	149	156	156	6.675	7.225
Cleveland *A6*	137	...	...	...	...	...	...	...
Cleveland *A5*	...	...	...	...	...	...	6.675	...
Crawfrdsvl. *M4*	133	145	...	151	...	153	6.775	7.325
Donora, Pa. *A5*	131	140	...	149	...	153	6.675	7.075
Duluth *A5*	131	140	138	149	...	153	6.675	7.075
Fairfield, Ala. *T2*	131	140	...	149	...	153	6.675	7.075
Galveston *D4*	139	148	...	...	...	...	...	...
Houston *S2*	139	151	...	...	...	164	7.075	7.625
Johnstn., Pa. *B3*	131	143	145	...	156	156	6.675	7.225
Joliet, Ill. *A5*	131	140	...	149	...	153	6.675	7.075
Kokomo, Ind. *C9*	133	142	...	151	...	155	6.775	7.175
Los Angeles *B2*	...	...	...	...	...	...	7.625	...
Kansas City *S2*	143	155	...	161	...	168	7.275	7.825
Minnequa *C6*	136	...	145	154	162	162	6.925	7.225
Monessen *P6*	131	145	...	...	...	157	6.675	7.225
Moline, Ill. *R3*	...	...	145	...	...	...	...	...
Pittsburg, Cal. *C7*	150	163	...	173	173	173	7.625	8.025
Portsmouth *P7*	132	...	...	...	...	...	6.675	...
Rankin, Pa. *A5*	131	140	...	...	...	153	6.675	7.075
So. Chicago *R3*	131	140	145	149	...	153	6.675	7.075
S. San Fran. *C6*	...	...	...	...	...	173	...	...
Sparrows Pt. *B3*	133	...	...	151	158	158	6.775	7.325
Struthers, O. *Y1*	...	...	...	...	...	...	6.675	7.175
Worcester *A5*	137	...	...	...	...	...	6.975	...
Williamsport, Pa. *S10*	133	...	158	...	...	...	...	...

Cut Nails, carloads, base $8.00 per keg (less 20¢ to jobbers), at Conshohocken, Pa. (*A2*).

* Alabama City and So. Chicago don't include zinc extra. Galvanized products computed with zinc at 11.0¢ per lb.

C-R SPRING STEEL

Cents Per Lb. F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, Conn. *S7*	6.15	8.00	8.60	10.55	12.85
Carnegie, Pa. *S9*	.....	8.00	8.60	10.55	12.85
Cleveland *A5*	5.45	7.65	8.60	10.55	12.85
Detroit *D2*	6.05	8.25	8.85	.....	.....
Harrison, N. J. *C11*	.....	.....	8.90	10.85	13.15
New Castle, Pa. *B4*	5.80	8.00	8.60	.....	.....
New Haven, Conn. *D1*	6.70	7.95	8.55	10.50	.....
Sharon, Pa. *S1*	5.80	8.00	8.60	10.55	12.85
Trenton *R4*	.....	7.95	8.55	10.50	12.80
Wairton, W. Va. *W3*	5.80	8.00	8.60	10.55	12.85
Worcester, Mass. *A5*	5.75	7.95	8.90	10.85	13.15
Youngstown *C5*	.....	8.06	8.60	10.55	12.85

* Sold on Pittsburgh base.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	30.08	36.28	26.51	31.91
	2½	12	40.51	48.86	35.70	43.07
	3	12	45.92	55.39	...	49.73
	3½	11	53.60	64.65	48.13	58.06
	4	10	65.91	79.50	63.92	77.10
National Tube	2	13	...	32.98	24.88	...
	2½	12	36.82	44.41	33.50	...
	3	12	42.52	51.28	38.40	...
	3½	11	49.63	59.87	45.16	...
	4	10	65.91	79.50	59.97	...
Pittsburgh Steel	2	13	27.34	32.98	...	...
	2½	12	36.82	44.41	...	...
	3	12	42.52	51.28	...	...
	3½	11	49.63	59.87	...	...
	4	10	65.91	79.50	...	...

WARE-HOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled A 4615 As rolled	Alloy Bars: Hot-Rolled A 4140 Annealed	Alloy Bars: Cold-Drawn A 4615 As Rolled	Alloy Bars: Cold-Drawn A 4140 Annealed
Baltimore	$.20	6.20	7.64	7.81[3]	7.00	.....	6.85	6.98	6.86	8.17	.....	.....	.....	.....
Birmingham	.15	6.10	7.00	8.00[4]	6.30	.....	6.35	6.35	6.15	8.75	.....	.....	.....	.....
Boston	.20	6.89	7.83	9.23	7.13	9.23–9.35[2]	7.12	7.06	6.67	8.35	12.40	12.25–12.28	.....	14.75–14.78
Buffalo	.20	6.18–6.20	7.15	9.00–9.07	6.65–6.79	.....	6.65–6.68	6.55–6.59	6.35–6.65	7.70	.....	12.17–15.35	14.45	14.55
Chicago	.20	6.18	7.12	8.85	6.42	.....	6.33–6.38	6.46	6.28	7.30	.....	11.75	.....	14.25
Cincinnati	.20	6.46	7.14	8.42	6.67	.....	6.80	6.88	6.53	7.61	.....	12.12	.....	14.82
Cleveland	.20	6.18	7.12	7.90	6.58	.....	6.50	6.79	6.34	7.65	.....	11.89	.....	14.39
Denver	.....	7.95	8.85	10.10	8.20	9.55	7.95	7.95	8.05	9.05	.....	.....	.....	15.25–15.75
Detroit	.20	6.35–6.45	7.25–7.32	8.34	6.30–7.31	7.36–8.35	6.53–6.85	6.93	6.56–6.57	7.60–7.69	12.27	12.12	14.52	13.44–14.62
Houston	.20	7.15	7.85	.....	7.45	.....	7.20	7.35	7.45	9.85	.....	12.95	.....	.....
Kansas City	.20	6.85	7.79	8.72	7.09	.....	7.05	7.13	6.95	8.08	.....	.....	.....	.....
Los Angeles	.20	7.25	9.00	9.60	7.55	10.75–11.30	7.20	7.35	7.15–7.25	9.10–9.75	13.40–13.55	13.05	15.75	15.85–16.05
Memphis	.10	6.79	7.69	.....	6.90	.....	7.01	7.09	6.88	7.89	.....	.....	.....	.....
Milwaukee	.20	6.35	7.29	8.22	6.59	.....	6.50–6.55	6.63	6.45	7.57	.....	11.92	.....	14.42
New Orleans	.15	6.51–6.66	7.56	8.25	6.63–6.78	.....	6.73–6.88	6.81–6.96	6.60–6.75	8.42–8.57	.....	.....	.....	.....
New York	.30	6.78	7.75	9.02	7.16	9.05	6.99	6.90	7.06	8.53–8.43[3]	11.99–12.29	10.39–12.14	14.04–14.54	12.64–14.64
Norfolk	.20	6.90	.....	.....	7.20	.....	7.15	7.20	7.20	8.50	.....	.....	.....	.....
Philadelphia	.25	6.53	7.55–8.25	8.35	7.02	.....	6.63	6.67	6.87	8.24	12.04	11.89	14.29	14.39
Pittsburgh	.20	5.95–6.18	6.82	8.30–8.60	6.20–6.55	.....	6.03–6.33	6.07–6.46	5.98–6.28	7.65	.....	11.45–11.75	.....	13.75–14.25
Portland	.10	8.00	9.80	9.95	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Salt Lake City	.20	9.05	10.80	10.65	9.35	.....	8.70	8.85	9.20	11.25	.....	.....	.....	.....
San Francisco	.15	7.35	8.70	9.90–10.15	7.60	10.35	7.20	7.25	7.15	9.75–9.85	13.55	12.80–13.05	15.50	15.55–16.05
Seattle	.20	8.15	8.70	9.95–10.10	8.02	.....	7.59	7.50	7.58	10.13	.....	13.40	.....	16.00
St. Louis	.20	6.48	7.42	8.35	6.72	.....	6.73	6.86	6.58	7.70	12.20	12.05	14.45	14.30–14.55
St. Paul	.15	6.84	7.78	8.71	7.08	.....	6.99	7.12	6.94	8.06	.....	12.19	.....	.....

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

Exceptions: (1)500 to 1499 lb. (2)20,000 lb or over. (3)450 to 1499 lb. (4)500 to 9999 lb. (5)1000 lb or over.

MANUAL LINCOLNWELD SIMPLIFIES PRODUCTION CUTS COSTS

BY utilizing the benefits of hidden-arc welding with the Manual Lincolnweld, fewer man hours are now required to fabricate this company's products. Shop setups are simpler. Welds are uniform, dependable in quality. Costs are substantially less than with hand methods.

These air reservoirs for Magor Car Corporation's dump cars are fabricated from ¼" steel plate and ⅛" heads. The shell is butt welded in one pass from the inside. Heads are butt welded to the shell in two passes using a backing bar.

To simplify and save setup time, the welding gun of the Manual Lincolnweld is mounted in a motorized gas cutting carriage for the longitudinal seam. (Fig. 1) For the circumferential weld, the entire carriage is elevated into position (Fig. 2) and the reservoir simply rotated beneath the welding gun using power rolls.

With Manual Lincolnweld, a continuous electrode is fed automatically to weld beneath a layer of granular flux that is deposited by the welding gun. High currents, up to 600 amps concentrated on a ⅝" electrode, eliminate the need for most joint preparation on plates up to ¾". The welds are practically self cleaning to cut finishing time.

Fig. 1. One Pass *of Manual Lincolnweld completes buttweld. Electrode is fed automatically to weld beneath a layer of granular flux eliminating arc rays. Photo courtesy of Magor Car Corp., Clifton, N. J.*

Fig. 2. Saves Setup. *Welding gun of Manual Lincolnweld is elevated in position with simple fixture. Welds are pressure tested to 125psi, and found free of porosity.*

INVESTIGATE MANUAL LINCOLNWELD TODAY—Learn what new developments in faster, more efficient hidden-arc welding are available at Lincoln to improve your shop efficiency and cut production costs. Write Dept. 1507.

THE LINCOLN ELECTRIC COMPANY
Cleveland 17, Ohio
THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT

—Miscellaneous Prices—

(Effective Sept. 3, 1953)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.325	5.20	5.275	....	....	....	....
Chicago *R3*	....	....	....	7.05	....	....	....
Cleveland *R3*	....	....	....	....	....	....	....
Ensley *T2*	4.325	5.20	....	....	....	....	....
Fairfield *T2*	....	5.20	....	....	....	5.125	....
Gary *U1*	4.325	5.20	....	....	....	5.125	....
Ind. Harbor *I3*	4.325	....	5.275	7.05	....	5.125	....
Johnstown *B3*	....	5.20	....	....	....	....	....
Joliet *U1*	....	5.20	5.275	....	....	....	....
Kansas City *S2*	....	....	....	7.30	....	....	11.00
Lackawanna *B3*	4.325	5.20	5.275	....	....	5.125	....
Lebanon *B3*	....	....	....	7.05	10.50	....	11.00
Minnequa *C6*	4.325	5.70	....	7.05	11.55	....	10.35
Pittsburgh *O1*	....	....	....	....	10.50	....	11.00
Pittsburgh *P5*	....	....	....	....	10.50	....	11.00
Pittsburgh *J3*	....	....	....	7.05	....	....	....
Pitt'g, Cal. *C7*	....	....	....	....	....	5.275	....
Seattle *B2*	....	....	....	7.55	....	5.275	11.50
Steelton *B3*	4.325	....	5.275	....	....	5.125	....
Struthers *Y1*	....	....	....	....	....	....	....
Torrance *C7*	....	....	....	....	....	5.275	....
Youngstown *R3*	....	....	....	7.05	....	....	....

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953 to end of season.

	Gross Ton
Openhearth lump	$11.15
Old range, bessemer	10.30
Old range, nonbessemer	10.15
Mesabi, bessemer	10.05
Mesabi, nonbessemer	9.90
High phosphorus	...

Prices based on upper Lake rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$14.50 to $15.00
Foundry beehive (f.o.b. oven)	
Connellsville, Pa.	$16.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	23.95
Swedeland, Pa., f.o.b.	23.85
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.42
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, del'd	23.21
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant threaded electrodes with nipples, unboxed

Diam. in In.	Length in in.	Cents Per lb.
	GRAPHITE	
24	84	20.50
18, 20	72	20.00
12, 14	72	20.50
7 to 10	60	21.00
6	60	23.25
4	40	26.00
3	40	27.50
2½	30	28.00
2	24	43.50
	CARBON	
40	100, 110	8.95
35	110	8.95
30	110	8.95
24	72 to 84	9.10
20	90	8.95
17	72	9.10
14	72	9.50
10, 12	60	10.30
8	60	10.55

First

in the new series of
ALLOYS OF IRON
Monographs . .
Edited by
FRANK T. SISCO

ALUMINUM IN IRON AND STEEL

By SAMUEL L. CASE
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Part I: **Aluminum as a Deoxidizer in Iron and Steel**

The Deoxidation of Steel by Aluminum. Oxide Inclusions in Steel Deoxidized with Aluminum. Sulphide and Nitride Inclusions in Steel Deoxidized with Aluminum. The Role of Aluminum in Austenitic Grain-Size Control. Effect of Aluminum on Notch Sensitivity and Related Properties of Steel. Effect of Aluminum on Aging of Steel. Some Other Consequences of the Use of Aluminum as a Deoxidizer.

Part II: **Aluminum as an Alloying Element in Iron and Steel**

The Constitution of Binary and Complex Iron-Aluminum Alloys. The Manufacture of the Simple and Complex Iron-Aluminum Alloys. Aluminum in Heat-Resisting Alloys. Aluminum in Permanent-Magnet Alloys. The Function of Aluminum in Nitriding Steels. The Aluminum Coating of Steel. Miscellaneous Uses of Aluminum as an Alloying Element in Iron and Steel.

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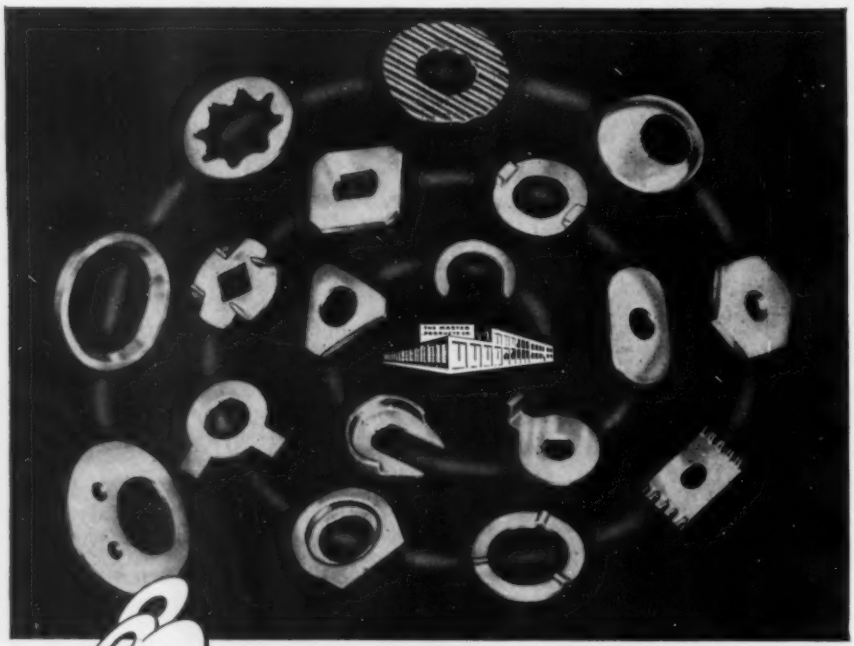

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BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

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Nuts, Hot Pressed, Cold Punched—S.A.E.

Pct Off List

	Less Keg Reg.	K.	Less Keg Hvy.	K.
½ in. & smaller	+2	15	+2	18
9/16 in. & ⅝ in.	+7	11	+39*	+10*
¾ in. to 1½ in. inclusive	+8	10	+27**	+6**
1⅝ in. & larger	+9	9	+27	+6

* 9/16 to ¾ in.
** ⅞ to 1½ in.

Nuts, Hot Pressed—Hexagon

½ in. & smaller	11	26	8	23
9/16 in. & ⅝ in.	2	18	+20	net
¾ in. to 1½ in. inclusive	+6	12	+25	+4
1⅝ in. & larger	+8	10	+25	+4

Nuts, Cold Punched—Hexagon

½ in. & smaller	11	26	8	23
9/16 in. & ⅝ in.	9	24	+2	15
¾ in. to 1½ in. inclusive	+1	16	+9	9
1⅝ in. & larger	+16	3	+20	net

Nuts, Semi-Finished—Hexagon

½ in. & smaller	23	36	14	28
9/16 in. & ⅝ in.	18	32	4	20
¾ in. to 1½ in. inclusive	8	23	+8	10
1⅝ in. & larger	+14	5	+20	net
	Light			
7/16 in. & smaller	33	43		
½ in. thru ⅝ in.	26	37		
¾ in. to 1½ in. inclusive	18	30		

Stove Bolts *Pct Off List*

Packaged, steel, plain finished 44½—10
Packaged, plain finish ..... 25½—10
Bulk, plain finish** 59*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets *Base per 100 lb*

½ in. & larger $8.90

Pct Off List

7/16 in. and smaller 30

Cap and Set Screws
(In bulk)

Pct Off List

Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	60
¾ in. thru 1 in. up to & including 6 in.	50
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	45
¾ in. thru 1 in. up to & including 6 in.	33
Milled studs	17
Flat head cap screws, listed sizes	15
Fillister head cap, listed sizes	*
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	37

Machine and Carriage Bolts

Pct Off List

	Less Case	C.
½ in. & smaller x 6 in. & shorter	4	30
9/16 in. & ⅝ in. x 6 in. & shorter	5	31
¾ in. & larger x 6 in. & shorter	3	19
All diam. longer than 6 in.	+4	13
Lag, all diam. x 6 in. & shorter	12	27
Lag, all diam. longer than 6 in.	8	23
Plow bolts	30	..

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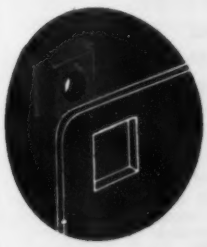
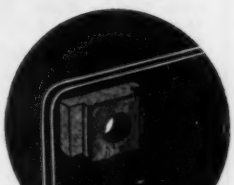


1 The square shape simplifies installation.

2 The small square portion is inserted and protrudes through the square hole that has been previously punched.



3 The protruding portion is now clinched at 4 corners with swaging tool.

4 Nut cannot work loose and variation in thickness of metal is taken care of automatically.

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—Miscellaneous Prices—

(Effective Sept. 8, 1953)

REFRACTORIES

Fire Clay Brick *Carloads, per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.25)	$99.30
No. 1 Ohio	92.40
Sec. quality, Pa., Md., Ky., Mo., Ill.	92.40
No. 2 Ohio	83.15
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.60)	14.40

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$99.30
Childs, Pa.	103.95
Hays, Pa.	105.10
Chicago District	122.40
Western Utah	116.55
California	122.85
Super Duty, Hays, Pa., Athens, Tex., Chicago	116.65
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	17.30
Silica cement, net ton, bulk, Hays, Pa.	19.60
Silica cement, net ton, bulk, Emsley, Ala.	18.45
Silica cement, net ton, bulk, Chicago District	18.45
Silica cement, net ton, bulk, Utah and Calif.	25.95

Chrome Brick *Per net ton*

Standard chemically bonded Balt., Chester	$86.00
Burned, Balt., Chester	80.00

Magnesite Brick

Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite *St. ⅜-in. grains*

Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., in bulk	38.00
in sacks	43.70

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢	$14.50

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content

72½%	$44.00
70% or more	42.50
60% or less	38.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron, c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, del'd. in East	12.0¢
Domestic sponge iron, 98+% Fe, carload lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe	44.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	60.0¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	53.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	43.50¢
Copper, reduced	43.50¢
Cadmium, 100-199 lb.	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd.	$3.50
Lead	21.75¢
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	88.0¢
Nickel, annealed	95.0¢
Nickel, spherical, unannealed	92.0¢
Silicon	33.5¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	83.9¢
Stainless steel, 316	$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$5.35
Zinc, 10 ton lots	23.0¢ to 30.5¢

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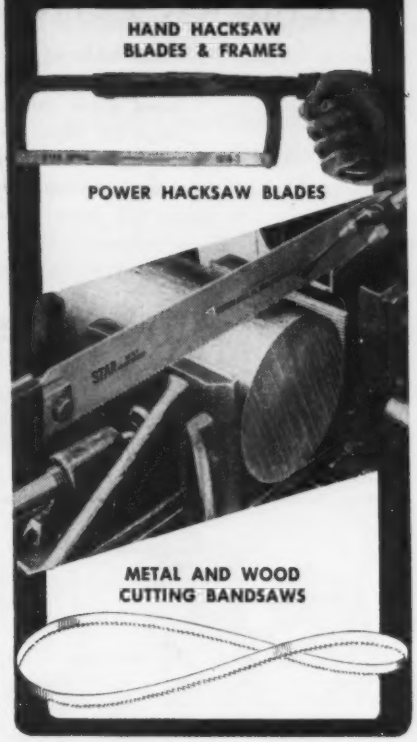

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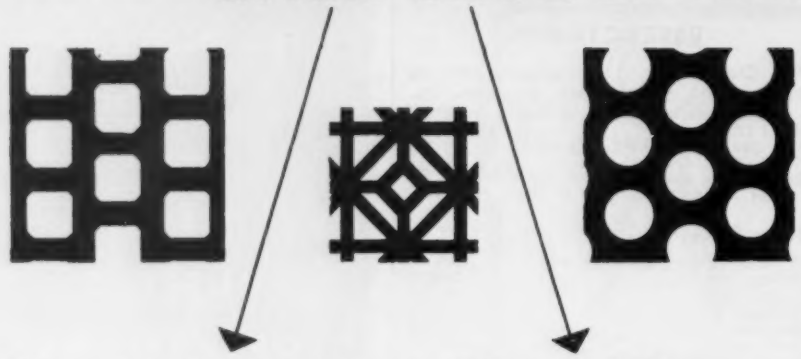

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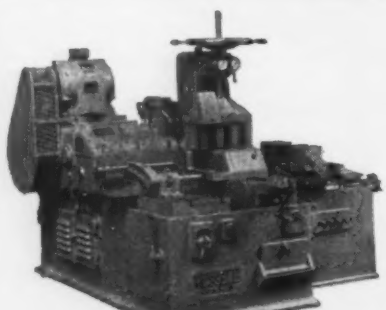

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—Ferroalloy Prices—

(Effective Sept. 8, 1953)

Ferrochrome

Contract prices, cents per lb contained Cr, lump size, bulk, in carloads, delivered.

66-72% Cr, 2% max. Si.

0.025% C	34.50	0.20% C	33.10
0.06% C	34.50	0.50% C	33.25
0.10% C	34.00	1.00% C	33.00
0.15% C	33.75	2.00% C	32.75

65-69% Cr, 4-9% C 24.75
62-66% Cr, 4-6% C, 6-9% Si 25.50

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads 25.85
Ton lots 28.00
Less ton lots 29.50

High-Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C $1.18
0.50% max. C 1.14
9 to 11% C 1.11

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.)

Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, bulk 2-in. x down, 25.75¢ per lb of contained Cr plus 13.40¢ per lb of contained Si.

Bulk 1-in. x down, 25.90¢ per lb contained Cr plus 12.60¢ per lb contained Si

Calcium-Silicon

Contract price per lb of alloy, lump delivered.

30-33% Cr, 60-65% Si, 3.00% max. Fe.

Carloads 19.00
Ton lots 22.10
Less ton lots 23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads 20.00
Ton lots 23.20
Less ton lots 23.20

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots 17.50
Less ton lots 19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots 16.50
Less ton lots 17.75

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed 17.50
Ton lots to carload packed 18.50
Less ton lots 20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size:

Producing Point	Base Mn Content	Cents per lb (Contained Mn)
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	76-80%	13.15 (Per lb of alloy)
Clairton, Pa.	74-76%	10.00
Johnstown, Pa.	74-76%	10.00
Sheridan, Pa.	74-76%	10.00

Add or subtract 0.1¢ for each 1% Mn above or below base content.

Briquets—delivered, 66 pct Mn.

Carloads, bulk 12.50
Ton lots, packed 14.05

Ferroalloy Prices

(Effective Sept. 8, 1953)

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	36.95
Ton lots	38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	31.50
Ton lots	32.50
Less ton lots	35.50
Premium for hydrogen-removed metal	1.50

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	30.00	31.85	33.05
0.07% max. C	27.95	29.80	31.00
0.15% max. C	27.45	29.30	30.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.40
Ton lots	13.05
Briquet contract basis carlots, bulk delivered, per lb of briquet	12.65
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $95.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	18.00
97% Si, 1% Fe	18.50

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
65% Si	13.60	90.95% Si	17.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

2/4 time and baseball time

Spur
Helical
Worm
Herringbone
Internal
*Coniflex Bevel
Spiral Bevel
Spline Shaft

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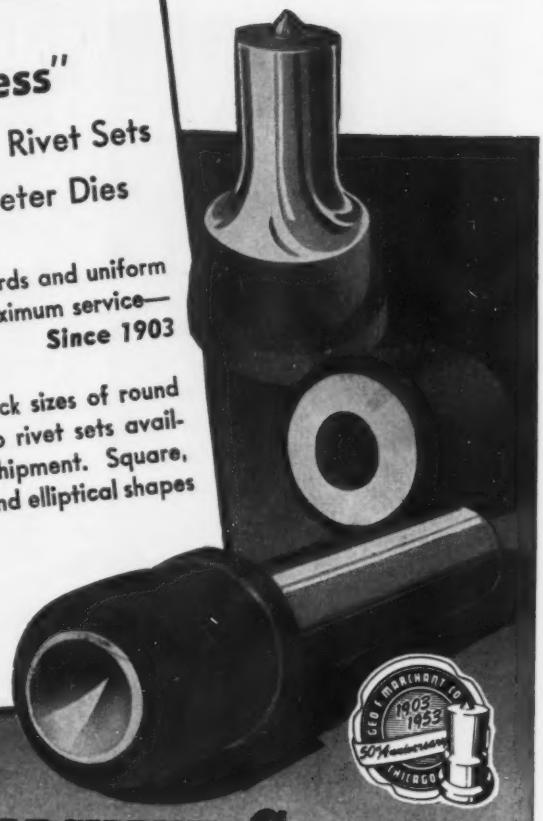

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—Ferroalloy Prices—

(Effective Sept. 8, 1953)

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
Carloads 9.90
Ton lots 11.30

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.15

Ferrocolumbium, 50-60% 2 in. x D contract basis, delivered per pound contained Cb.
Ton lots $6.40
Less ton lots 6.45

Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30% C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $4.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload $75.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.50
Less ton lots 1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, f.o.b. $4.45

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.12

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump ..... 14.50¢
Ton lots, bulk lump ..... 15.75¢
Less ton lots, lump ..... 16.25¢

Vanadium Pentoxide, 86 - 89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 8.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound.... 50¢

Corbortam, Ti 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots, per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots.... $1.20
F.o.b. Wash., Pa.; 100 lb up
10 to 14% B..... .85
14 to 19% B..... 1.20
19% min. B..... 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
No. 1 ..... $1.00
No. 6 ..... 65¢
No. 79 ..... 50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots $1.46
Less ton lots 1.57

Nickel - Boron, 15-18%, B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered
Less ton lots $2.05

Silcaz, contract basis, delivered.
Ton lots ..... 45.00¢

If your workers "can't hear themselves think," chances are *you'll* hear about it in lowered production and damaged hearing.

Loud industrial noises sap energy, interfere with job concentration, and sometimes result in serious hearing loss. M.S.A. Ear Defenders block out these costly noises, yet allow wearer to hear warning signals, speech, and telephone conversation.

M.S.A. Ear Defender design insures comfortable fit; complete closure of ear canal; easy to insert, remove. Ear Defenders are easily cleaned with soap and water. Convenient carrying case keeps them clean in pocket. Write for details.

MSA SAFETY EQUIPMENT HEADQUARTERS

Mine Safety Appliances Co.
Braddock, Thomas & Meade Sts.
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METAL STAMPING FACILITIES

by Lansing

at your Service for...

TRANSPORTATION EQUIPMENT
HOUSEHOLD APPLIANCES
ELECTRICAL EQUIPMENT
INDUSTRIAL EQUIPMENT
FARM IMPLEMENTS

Lansing Stamping Co.
ESTABLISHED 1914
LANSING 2 MICHIGAN

Formed steel bridge rails

WE HAVE STEEL AND PRESSES --- for making these sections in lengths up to 20'.....steel up to 1 2" thick!

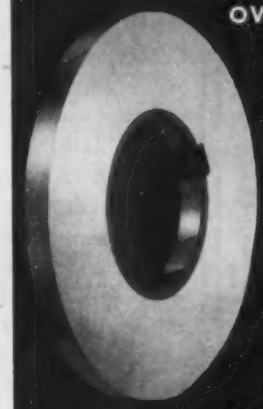
MAY WE BID ON YOUR REQUIREMENTS

HARRISON SHEET STEEL CO.
4718 W. FIFTH AVENUE CHICAGO 44

COWLES

GANG SLITTING KNIVES

OVER 30 YEARS EXPERIENCE



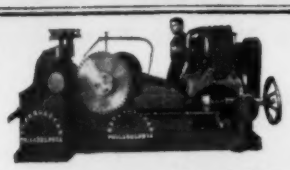
Standard for Service and *Durability*. Ground to extremely close Tolerances and Finish. Made by *Toolmakers*.

COWLES TOOL COMPANY
2086 W. 110th ST. CLEVELAND 2, OHIO

LELAND-GIFFORD

the BIG NAME in DRILLING MACHINES

LELAND-GIFFORD COMPANY, WORCESTER, MASSACHUSETTS



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WIRE — STRIP, COILED FOR ELECTRIC FUSE ELEMENTS
EYELETS ALSO BRASS OR STEEL

THE PLATT BROS. & CO., WATERBURY, CONN.

GOSS and DE LEEUW

MULTIPLE SPINDLE
CHUCKING MACHINES
Four, Five, Six, Eight Spindles • Work and Tool Rotating Type
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

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HOT DIP GALVANIZING

any size or shape product, any size
order from the smallest to the largest

Excellent facilities for export shipment

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OHIO LOCOMOTIVE CRANES

25 TO 50 TON CAPACITY

DIESEL • GASOLINE • ELECTRIC • STEAM

THE OHIO LOCOMOTIVE CRANE CO.
BUCYRUS, OHIO

THE CLEVELAND STEEL TOOL CO.

Punches, Dies, Chisels, Rivet Sets
660 E. 82nd St., Cleveland, O.
If it's RIVETED you KNOW it's safe

SQUARE BEVEL WASHERS

We Stock All Sizes

LANCASTER MALLEABLE CASTINGS CO.
LITITZ & KELLER AVE. • LANCASTER, PA.

HAYWARD BUCKETS

Use this Electric Motor Clam Shell for rehandling bulk materials in Industrial Plants.

THE HAYWARD CO., 40-50 Church St., N.Y.

"I SAW IT IN THE IRON AGE,"
is a common phrase in the metalworking industry. Let the industry say it about your product.

RE-NU-BILT
GUARANTEED
ELECTRIC POWER EQUIPMENT

D. C. MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	2200	G.E.	MCF	600	450/500
1	2000	Whse.	Mill	600	230/460
1	940	Whse.	QM	250	140/170
1	900	Whse.		250	450/550
1	825	Whse.		250	95/190
1	800	Al. Ch.		250	400/800
1	500	Whse.	CC-316	600	300/900
2	450	Whse.		550	415
1	400	G.E.	MCF	550	300/1050
2	300	Whse.	CH-5004	250	575/1150
1	200/300	G.E.	MPC	230	360/920
1	200	Rel.	1070T	230	720
1	200	Whse.	CB-5113	250	400/900
1	150	G.E.		600	250/750
1	150	Cr. Wh.	85H	230	1150
8	150	Cr. Wh.	83H-TEFC	230	900
1	150	Whse.	SK-151B	230	900/1800
1	150	Whse.	SK-201	230	360/950
1	50/120	G.E.	MCF	230	250/1000
2	100	Whse.	SK-181	230	450/1000
1	100	G.E.	CDP-115	230	1750

MILL & CRANE

1	50	G.E.	CO-1810	230	725
1	20	Whse.	K-5	230	975
4	15	Whse.	K-5	230	630
3	10	C.W.	SCM-AH	230	1150
1	10	G.E.	MD-104	230	400/800
2	6.25	Whse.	K-3	230	600
4	3	C.W.	SCM-FF	230	1750
2	3	Whse.	HK-2	230	835

A.C. MOTORS

3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1500	G.E.	MT-498	2300	360
1	1500	ABB		2300	720
1	1200	G.E.	MT	2300	275
2	1000	A.C.	Mill	2300	240
1	500	Whse.	CW	550	350
1	500	G.E.	I-M	2300	900
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1218	2200	435
1	350	G.E.	MT-442Y	2300/4000	253
2	300	G.E.	MT-565Y	2300	900
1	250	G.E.	MT-424-Y	4000	257
1	250	G.E.	MT-559B	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	26QB	440	585
1	200	G.E.	IM-16	440	600
1	200	G.E.	IM	440	435
1	200	G.E.	MTP	440	1170
1	150(unused)	Whse.	CW	2300	435
1	150	G.E.	IM-16	440	600
2	125	A.C.		440	865
1	125	Al. Ch.		440	720
4	125	G.E.	MT-566Y	440/2300	435
1	100	G.E.	IM	440	600
5	100	A.C.	ANY	440	695
1	100	G.E.	IM-16	2300	435
1	100	Whse.	CW-868A	440	700

SQUIRREL CAGE

2	650	G.E.	FT-559BY	440	3570
2	450	Whse.	CS-1420	2300/4150	354
1	200	G.E.	IK-17	440	580
8	200	G.E.	KT-557	440	1800
1	150	Whse.	CS-8568	440	880
1	150	Whse.	CS	440	580
1	150/75	G.E.	IK	440	900/450
2	125	Al. Ch.	ARW	2200	1750
1	125	Whse.	MS	440	485

SYNCHRONOUS

1	3500	G.E.	TS	2300	257
1	2100	G.E.	ATI	2300	360
1	1750	G.E.	ATI	2300	3600
2	2000	Whse.		2300	120
3	735	G.E.	ATI	2200/12000	600
1	450	Whse.		2200	450
1	350	G.E.	TS	2200	156

M-G Sets—3 Ph. 60 Cy

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
2	2000/2400	G.E.	450	250/300	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
1	2000	G.E.	300	25cy 660	11000
2	2000	G.E.	514	600	6600/13200
2	1500	G.E.	514	250	6600/13200
1	1500	G.E.	720	600	6600/13200
1	1500	G.E.	600	600	4160
1	1500	C.W.	514	30/115	4000/18000
2	1000	Whse.	900	600	4160
1	1000	G.E.	900	260	6600
1	1000(SU)	G.E.	900	250	2200
1	750	Whse.	900	275	4160
1	750	C.W.	514	30/115	2300
1	600	G.E.	720	250	440/2300
1	500	G.E.	720	125	2300
1	500	Whse.	900	125/250	440
1	500	Whse.	1200	125/250	2300
1	400(SU)	Cr. Wh.	1200	125/250	2300
1	150	Whse.	1200	275	2300
1	140(SU)	Cr. Wh.	690	125/250	440/2300
1	100	G.E.	1200	250	2300/4000
1	100	G.E.	1170	125	220/440

FREQUENCY CHANGER SETS

Qu.	KW	Make	Freq.	Voltages
1	12500	Whse.	25/60	13200/13200
1	3000	G.E.	25/60	2300/2300/4000
2	2500	G.E.	25/62.5	2300/2300
1	1000	G.E.	25/58.3	4400/2300
1	500	Al. Ch.	2560	11000/2300

BELYEA COMPANY, INC.
47 Howell Street, Jersey City 6, N. J.

The Clearing House

NEWS OF USED AND REBUILT MACHINERY

Lease Tools . . . Used machinery dealers as well as machine tool builders are concerned and confused by reports that the government may decide to lease its machine tools to private industry (THE IRON AGE, Aug. 13, 1953, p. 105). And at the end of last week a definite statement on the government's policy was still not ready. The problem of what to do with government-owned machine tools is currently being thrashed out by a group of high-ranking officials closely concerned with production and production equipment. Included are Under Secretary of Defense Roger Kyes, Assistant Defense Secretary Charles Thomas, Commerce Secretary Sinclair Weeks, and Office of Defense Mobilization head Arthur Flemming.

Don't Know When . . . THE IRON AGE was told that the results of discussions by this group will be seen "soon" — though Defense Dept. doesn't seem to know when this may be—in the form of a uniform policy for all agencies.

None of the government officials contacted could say whether leasing of government-owned machine tools would be authorized or not. In addition, it hasn't as yet been decided whether Defense Dept. or ODM will administer whatever policy is finally adopted.

Remember Last Time . . . Privately there's feeling in Washington that the military would like to see ODM given the responsibility. Too many Pentagon officials remember the foul up on disposal of surplus tools after World War II to want to take on the responsibility of the current disposal problem.

Naturally, both used machinery dealers and builders are worried about the effect leasing of government-owned machine tools would have on their markets. It is reported that many used machinery dealers have written Washington to express their opposition to the plan.

Had Rough Week . . . While the week before Labor Day, with its terrific heat, was called the roughest of the year by Philadelphia used machinery dealers, signs are more encouraging than they have been throughout the summer.

More inquiries are coming in for used machinery, the dealers report. This is encouraging, but unfortunately the business still isn't materializing. Buyers are becoming increasingly price conscious and dealers are trimming their prices to move machinery.

Still Holding On . . . Main trouble is that it's still difficult for a dealer to buy used equipment. With the cancellation of some subcontracts it was expected that many of the smaller machine shops would sell their tools. But this anticipated dumping has not yet occurred.

The buying market, dealers state, is higher than it should be relative to prices in the selling market. Asking prices for late model machinery or even "reasonably modern" tools are just too high.

Plan Ahead . . . Frank J. Lunney of Interstate Machinery Co. reports that plans for next year's Machinery Dealers National Assn. convention are shaping up nicely.

The Philadelphia chapter, which will act as host at the Hotel Warwick next May, is holding its first fall meeting on Sept. 15 and discussion of the convention will head the list of business at hand.

Industrial Plants Corp. will hold an auction of cold headed screw manufacturing and toolroom machinery on the former premises of the Screw Corp. of America, 34 Meadow St., New Britain, Conn. The sales date is Thursday, Sept. 24, at 11 am.